Interface

Product Catalog

Interface
FORCE MEASUREMENT SOLUTIONS.

The World Leader in Force Measurement Solutions™

Notes:

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Load Cells

LowProfile®

Canister

Column

Intrinsically Safe

interface
FORCE MEASUREMENT SOLUTIONS.

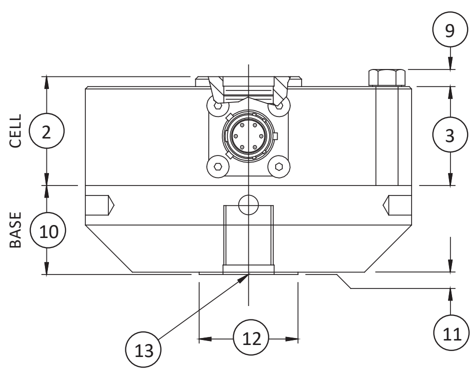
1000 FATIGUE RATED LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

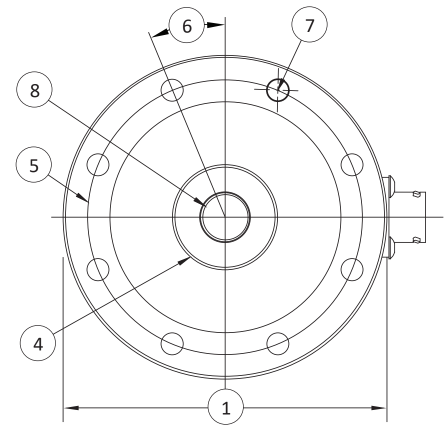
- Capacities from 250 to 50K lbf (1.25 to 225 kN)
- Proprietary Interface Temperature compensated strain gages
- 100 million fully reversed cycles
- Performance to 0.03%
- Eccentric load compensated
- Low deflection
- 0.0008%/°F (0.0015%/°C) Temperature effect on output
- BaroMetric compensation
- Shunt calibration
- Tension and compression

STANDARD CONFIGURATION

Model 1010ACK-2.5K (shown)



SIDE VIEW



TOP VIEW

Dimensions

See Drawing	MODEL					
	1010		1020		1032	
	CAPACITY					
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	250, 500, 1K, 2.5K, 5K	1.25, 2.5, 5, 12.5, 25	12.5K, 25K	50, 125	50K	225
	in	mm	in	mm	in	mm
(1)	Ø4.13	Ø104.8	Ø6.06	Ø153.9	Ø8.00	Ø203.2
(2)	1.38	34.9	1.75	44.5	2.50	63.5
(3)	1.25	31.7	1.63	41.4	2.25	57.2
(4)	Ø1.34	Ø34.0	Ø2.65	Ø67.3	Ø3.76	Ø95.2
(5)	Ø3.50	Ø88.9	Ø5.13	Ø130.3	Ø6.50	Ø165.1
(6)	22.5°	22.5°	15.0°	15.0°	11.25°	11.25°
(7)	Ø0.28	Ø7.1	Ø0.41	Ø10.4	Ø0.53	Ø13.5
	8 places		12 places		16 places	
(8)	⅝-18 UNF-3B ↧ 1.12	M16x2-4H ↧ 28.4	1 ¼-12 UNF-3B ↧ 1.40	M33x2-4H ↧ 35.6	1 ¾-12 UNF-3B ↧ 2.15	M42x2-4H ↧ 54.6
(9)	0.20	5.1	0.30	7.6	0.40	10.2
(10)	1.13	28.6	1.75	44.5	2.00	50.8
(11)	0.03	0.8	0.03	0.8	0.03	0.8
(12)	Ø1.25	Ø31.8	Ø2.25	Ø57.2	Ø3.00	Ø76.2
(13)	⅝-18 UNF-3B ↧ 0.87	M16x2-4H ↧ 22.1	1 ¼-12 UNF-3B ↧ 1.40	M33x2-4H ↧ 35.6	1 ¾-12 UNF-3B ↧ 1.75	M42x2-4H ↧ 44.5

FORCE MEASUREMENT SOLUTIONS.

1000 FATIGUE RATED LOAD CELL (U.S. & METRIC)

Specifications

PARAMETERS			MODEL			
			1010	1010	1020	1032
			CAPACITY			
Measuring Range	U.S. (lbf)		250, 500, 1K	2.5K, 5K	12.5K, 25K	50K
	Metric (kN)		1.25, 2.5, 5	12.5, 25	50, 125	225
ACCURACY - (MAX ERROR)						
Static Error Band – %FS			±0.03	±0.04	±0.04	±0.05
Nonlinearity – %FS			±0.04	±0.04	±0.04	±0.05
Hysteresis – %FS			±0.03	±0.04	±0.05	±0.05
Nonrepeatability – %RO			±0.02	±0.02	±0.02	±0.02
Creep, in 20 min – %			±0.025	±0.025	±0.025	±0.025
Side Load Sensitivity – %			±0.1	±0.1	±0.1	±0.1
Eccentric Load Sensitivity – % / in			±0.1	±0.1	±0.1	±0.1
TEMPERATURE						
Compensated Range		°F	+15 to +115	+15 to +115	+15 to +115	+15 to +115
		°C	-10 to +45	-10 to +45	-10 to +45	-10 to +45
Operating Range		°F	-65 to +200	-65 to +200	-65 to +200	-65 to +200
		°C	-55 to +90	-55 to +90	-55 to +90	-55 to +90
Effect on Zero – %RO MAX		°F	±0.0008	±0.0008	±0.0008	±0.0008
		°C	±0.0015	±0.0015	±0.0015	±0.0015
Effect on Output – %RO MAX		°F	±0.0008	±0.0008	±0.0008	±0.0008
		°C	±0.0015	±0.0015	±0.0015	±0.0015
ELECTRICAL						
Rated Output – mV/V (Nominal)			1.0	2.0	2.0	2.0
Excitation Voltage – VDC MAX			20	20	20	20
Bridge Resistance – Ohm (Nominal)			350	350	350	350
Zero Balance – %RO			±1.0	±1.0	±1.0	±1.0
Insulation Resistance – Megohm			5000	5000	5000	5000
MECHANICAL						
Safe Overload – %CAP			±300	±300	±300	±300
Deflection @ RO		in	0.0005	0.001	0.001	0.002
		mm	0.013	0.025	0.025	0.050
Optional Base – P/N (Metric)			B101 (M)	B102 (M)	B103 (M)	B112 (M)
Natural Frequency – kHz			5.0, 6.9, 9.8	6.6, 9.4	6.5, 7.0	5.8
Weight		lbs	1.5	3.3	9.5	26
		kg	0.7	1.5	4.3	12
Calibration			Tension & Compression			
Material			Aluminum	Alloy Steel		

OPTIONS

- Base (recommended)
- Connector protection
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- CU.S.tom calibration
- Multiple bridge
- Special threads
- Dual diaphragm
- Special Temperature range
- Cable length
- Add connector to cable

CONNECTOR OPTIONS

- Integral cable – 10 ft (3 m)
- PT02E-10-6P bayonet connector
- PC04E-10-6P screw-type connector

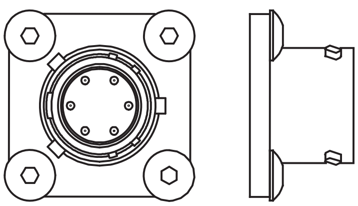
ACCESSORIES

- Mating connector
- Mating cable
- Instrumentation
- Loading hardware

1000 FATIGUE RATED LOAD CELL (U.S. & METRIC)

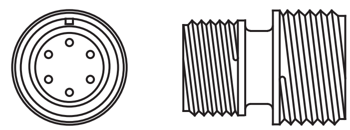
BAYONET CONNECTOR

Model 1010ACK-2.5K-B (Shown)



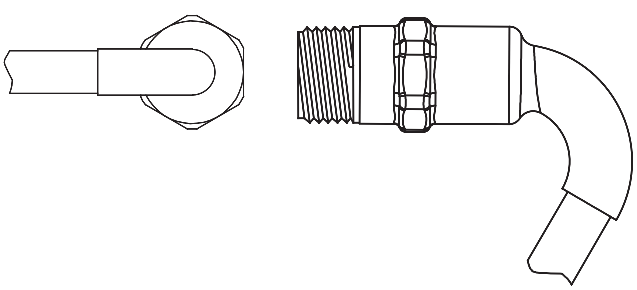
SCREW TYPE CONNECTOR

Model 1010AF-2.5K-B (Shown)

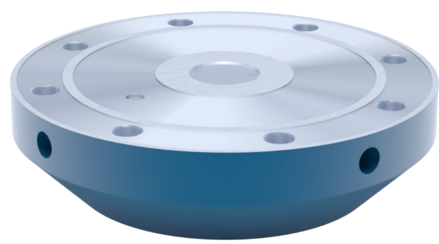


INTEGRAL 10 FT. CABLE CONNECTOR

Model 1010AJ-2.5K-B (Shown)



BASE



Model B1XX-1 (Shown)

interface

FORCE MEASUREMENT SOLUTIONS.

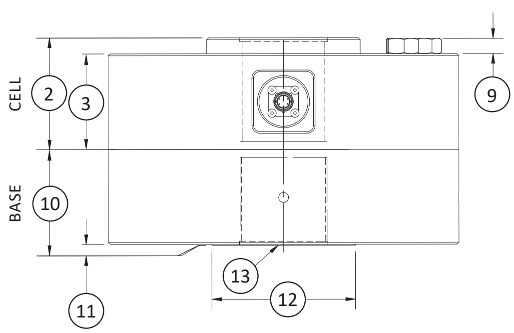
1000 FATIGUE RATED HIGH CAPACITY LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

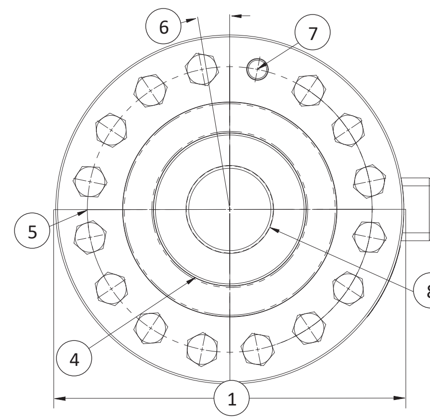
- Capacities from 100K to 1000K lbf (450 to 4500 kN)
- Proprietary Interface Temperature compensated strain gages
- 100 million fully reversed cycles
- Performance to 0.06%
- Eccentric load compensated
- Low deflection
- 0.0008%/°F (0.0015%/°C) temp. effect on output
- BaroMetric compensation
- Shunt calibration
- Tension and compression

STANDARD CONFIGURATION

Model 1040CDS-100K (Shown)



SIDE VIEW



TOP VIEW

Dimensions

See Drawing	MODEL											
	1040		1044		1052		1060		1080		1090	
	CAPACITY											
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	100K	450	135K	600	200K	900	300K	1500	500K	2250	1000K	4500
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
(1)	Ø11.00	Ø279.0	Ø11.00	Ø279.0	Ø12.00	Ø304.8	Ø15.50	Ø393.7	Ø20.50	Ø520.7	Ø26.00	Ø660.4
(2)	3.50	88.9	4.00	101.6	4.50	114.3	5.50	139.7	6.25	158.8	7.75	196.9
(3)	3.00	76.2	3.25	82.6	4.25	108.0	5.00	127.0	6.00	152.4	7.50	190.5
(4)	Ø4.81	Ø122.2	Ø4.81	Ø122.2	Ø5.68	Ø144.3	Ø7.73	Ø196.3	Ø10.55	Ø267.9	Ø13.79	Ø350.3
(5)	Ø9.00	Ø228.6	Ø8.75	Ø222.2	Ø9.88	Ø250.8	Ø12.68	Ø322.1	Ø16.50	Ø419.1	Ø20.50	Ø520.7
(6)	11.25°	11.25°	11.25°	11.25°	9.00°	9.00°	7.50°	7.50°	6.43°	6.43°	5.63°	5.63°
(7)	Ø0.65	Ø16.5	Ø0.79	Ø20.1	Ø0.79	Ø21.0	Ø0.94	Ø23.9	Ø1.06	Ø27.0	Ø1.31	Ø33.3
	16 Places		16 Places		20 Places		24 Places		28 Places		32 Places	
(8)	2 ¾-8 UNF-3B ↧ 3.25	M72 X 2-4H ↧ 82.6	2 ¾-8 UNF-3B ↧ 3.75	M72 X 2-4H ↧ 96.3	3 ½-8 UN-3B ↧ 3.75	M90 X 3-4H ↧ 95.3	4 ¼-8 UN-3B ↧ 4.25	M120 X 4-4H ↧ 108.0	6.00-8 UN-3B ↧ 5.63	M150 X 4-4H ↧ 130.0	8.00-8 UN-3B ↧ 7.00	M200 X 4-4H ↧ 178.0
(9)	0.50	12.7	0.50	12.7	0.59	15.0	0.69	17.5	1.00	25.4	1.25	31.3
(10)	3.00	76.2	4.00	101.6	4.50	114.3	5.00	127.0	7.00	177.8	9.00	228.6
(11)	0.03	0.8	0.03	0.8	0.03	0.8	0.03	0.8	0.03	0.8	0.10	2.5
(12)	Ø4.50	Ø114.3	Ø4.50	Ø114.3	Ø6.00	Ø152.4	Ø7.75	Ø196.9	Ø10.55	Ø267.9	Ø14.00	Ø355.6
(13)	2 ¾-8 UNF-3B ↧ 2.75	M72 X 2-4H ↧ 69.8	2 ¾-8 UNF-3B ↧ 3.75	M72 X 2-4H ↧ 95.3	3 ½-8 UN-3B ↧ 3.75	M90 X 3-4H ↧ 95.3	4 ¼-8 UN-3B ↧ 4.25	M120 X 4-4H ↧ 108.0	6.00-8 UN-3B ↧ 6.38	M150 X 4-4H ↧ 162.0	8.00-8 UN-3B ↧ 7.25	M200 X 4-4H ↧ 184.0

1000 FATIGUE RATED HIGH CAPACITY LOAD CELL (U.S. & METRIC)

Specifications

PARAMETERS			MODEL					
			1040	1044	1052	1060	1080	1090
			CAPACITY					
Measuring Range	U.S. (lbf)		100K	135K	200K	300K	500K	1000K
	Metric (kN)		450	600	900	1500	2250	4500
ACCURACY – (MAX ERROR)								
Static Error Band – %FS			±0.06	±0.07	±0.09	±0.10	±0.15	±0.20
Nonlinearity – %FS			±0.06	±0.08	±0.09	±0.10	±0.15	±0.20
Hysteresis – %FS			±0.06	±0.08	±0.09	±0.10	±0.15	±0.20
Nonrepeatability – %RO			±0.02	±0.02	±0.02	±0.02	±0.02	±0.02
Creep, in 20 min – %			±0.025	±0.025	±0.025	±0.025	±0.025	±0.025
Side Load Sensitivity – %			±0.1	±0.25	±0.25	±0.25	±0.25	±0.25
Eccentric Load Sensitivity – % / in			±0.1	±0.25	±0.25	±0.25	±0.25	±0.25
TEMPERATURE								
Compensated Range		°F	+15 to +115	+15 to +115	+15 to +115	+15 to +115	+15 to +115	+15 to +115
		°C	-10 to +45	-10 to +45	-10 to +45	-10 to +45	-10 to +45	-10 to +45
Operating Range		°F	-65 to +200	-65 to +200	-65 to +200	-65 to +200	-65 to +200	-65 to +200
		°C	-55 to +90	-55 to +90	-55 to +90	-55 to +90	-55 to +90	-55 to +90
Effect on Zero – %RO MAX		°F	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008
		°C	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015
Effect on Output – %RO MAX		°F	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008
		°C	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015
ELECTRICAL								
Rated Output – mV/V (Nominal)			2.0	2.0	2.0	2.0	2.0	2.0
Excitation Voltage – VDC MAX			20	20	20	20	20	20
Bridge Resistance – Ohm (Nominal)			350	350	350	350	350	350
Zero Balance – %RO			±1.0	±1.0	±1.0	±1.0	±1.0	±1.0
Insulation Resistance – Megohm			5000	5000	5000	5000	5000	5000
MECHANICAL								
Safe Overload – %CAP			±300	±300	±300	±300	±300	±300
Deflection @ RO		in	0.003	0.003	0.004	0.004	0.005	0.005
		mm	0.08	0.08	0.10	0.10	0.13	0.13
Optional Base – P/N (Metric)			B105 (M)	B116 (M)	B121 (M)	B122 (M)	B123 (M)	B125 (M)
Natural Frequency – kHz			4.9	5.0	5.5	5.5	5.5	5.5
Weight		lbs	68	70	100	200	450	860
		kg	30.9	31.8	45	90	205	390
Calibration			Tension & Compression					
Material			Alloy Steel					

OPTIONS

- Base (Recommended)
- Connector protection
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- CU.S.tom calibration
- Multiple bridge
- Special threads
- Dual diaphragm
- Special Temperature range

CONNECTOR OPTIONS

- Integral cable – 10 ft (3 m)
- PT02E-10-6P bayonet connector
- PC04E-10-6P screw-type connector

ACCESSORIES

- Mating connector
- Mating cable
- Instrumentation
- Loading hardware

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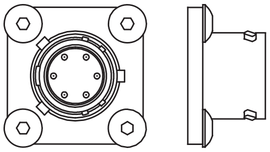
1000 FATIGUE RATED HIGH CAPACITY LOAD CELL (U.S. & METRIC)

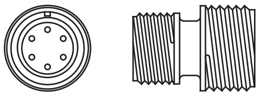
BAYONET CONNECTOR

Model 1040CDS-100K-B (Shown)

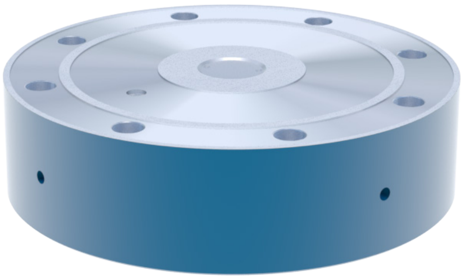


SCREW TYPE CONNECTOR

Model 1040ALD-100K-B (Shown)



BASE



Model B1XX (Shown)

interface
FORCE MEASUREMENT SOLUTIONS.

1100 ULTRA PRECISION LOAD CELL (U.S. & METRIC)

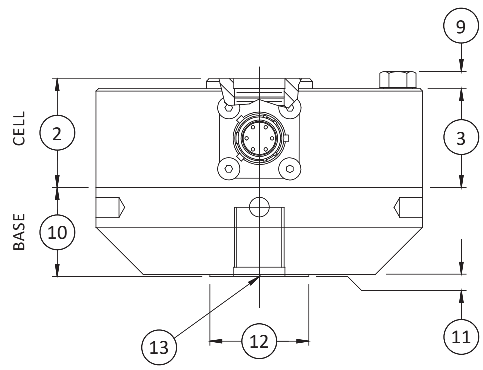
FEATURES & BENEFITS

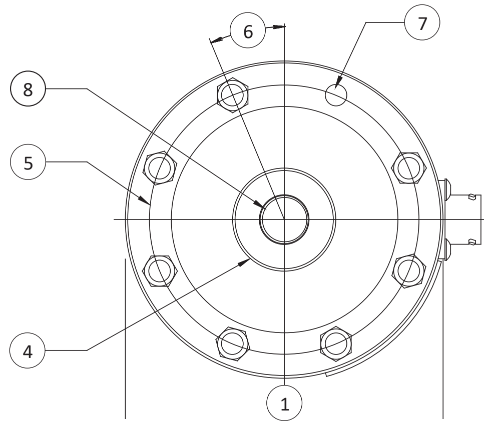
- Capacities from 300 to 200K lbf (1.5 to 900 kN)
- Proprietary Interface Temperature compensated strain gages
- Performance to 0.02%
- High output – to 4 mV/V
- Eccentric load compensated
- Low deflection
- 0.0008%/°F (0.0015%/°C) temp. effect on output
- Shunt calibration
- High precision base included
- BaroMetric compensation
- Tension and compression

STANDARD CONFIGURATION

Model 1120ACK-50K (Shown)

SIDE VIEW





TOP VIEW

Dimensions

See Drawing	MODEL							
	1110		1120		1132		1140	
	CAPACITY							
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	300, 500, 1K, 2K, 3K, 5K, 10K	1.5, 2.5, 5, 10, 25, 50	25K, 50K	100, 250	100K	450	200K	900
	in	mm	in	mm	in	mm	in	mm
(1)	Ø4.13	Ø104.8	Ø6.06	Ø153.9	Ø8.00	Ø203.2	Ø11.00	Ø279.0
(2)	1.38	34.9	1.75	44.5	2.50	63.5	3.50	88.9
(3)	1.25	31.7	1.63	41.4	2.25	57.2	3.00	76.2
(4)	Ø1.34	Ø34.0	Ø2.65	Ø67.3	Ø3.76	Ø95.2	Ø4.81	Ø122.2
(5)	Ø3.50	Ø88.9	Ø5.13	Ø130.3	Ø6.50	Ø165.1	Ø9.00	Ø228.6
(6)	22.5°		15.0°		11.25°		11.25°	
(7)	Ø0.28	Ø7.10	Ø0.41	Ø10.4	Ø0.53	Ø13.5	Ø0.65	Ø16.5
	8 Places		12 Places		16 Places			
(8)	⅝-18 UNF-3B ↧1.12	M16x2-4H ↧28.4	1 ¼-12 UNF-3B ↧1.40	M33x2-4H ↧35.6	1 ¾-12 UNF-3B ↧2.15	M42x2-4H ↧54.6	2 ¾-8 UNF-3B ↧3.25	M72x2-4H ↧82.6
(9)	0.20	5.1	0.30	7.6	0.40	10.2	0.50	12.7
(10)	1.13	28.6	1.75	44.5	2.00	50.8	3.00	76.2
(11)	0.03	0.8	0.03	0.8	0.03	0.8	0.03	0.8
(12)	1.25	Ø 31.8	Ø 2.25	Ø 57.2	Ø 3.00	Ø 76.2	Ø 4.50	Ø 114.3
(13)	⅝-18 UNF-3B ↧0.87	M16x2-4H ↧22.1	1 ¼-12 UNF-3B ↧1.40	M33x2-4H ↧35.6	1 ¾-12 UNF-3B ↧1.75	M42x2-4H ↧44.5	2 ¾-8 UNF-3B ↧2.75	M72x2-4H ↧69.8

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Interface
FORCE MEASUREMENT SOLUTIONS.

1100 ULTRA PRECISION LOAD CELL (U.S. & METRIC)

Specifications

PARAMETERS		MODEL				
		1110	1110	1120	1132	1140
		CAPACITY				
Measuring Range	U.S. (lbf)	300, 500, 1K, 2K, 3K	5K, 10K	25K, 50K	100K	200K
	Metric (kN)	1.5, 2.5, 5, 10	25, 50	100, 250	450	900
ACCURACY – (MAX ERROR)						
Static Error Band – % FS		±0.02	±0.025	±0.035	±0.05	±0.06
Nonlinearity – %FS		±0.03	±0.035	±0.035	±0.05	±0.06
Hysteresis – %FS		±0.02	±0.035	±0.045	±0.05	±0.06
Nonrepeatability – %RO		±0.01	±0.01	±0.01	±0.01	±0.01
Creep, in 20 min – %		±0.025	±0.025	±0.025	±0.025	±0.025
Side Load Sensitivity – %		±0.1	±0.1	±0.1	±0.1	±0.1
Eccentric Load Sensitivity – % / in		±0.1	±0.1	±0.1	±0.1	±0.1
TEMPERATURE						
Compensated Range	°F	+15 to +115	+15 to +115	+15 to +115	+15 to +115	+15 to +115
	°C	-10 to +45	-10 to +45	-10 to +45	-10 to +45	-10 to +45
Operating Range	°F	-65 to +200	-65 to +200	-65 to +200	-65 to +200	-65 to +200
	°C	-55 to +90	-55 to +90	-55 to +90	-55 to +90	-55 to +90
Effect on Zero – %RO MAX	°F	±0.0004	±0.0004	±0.0004	±0.0004	±0.0004
	°C	±0.0007	±0.0007	±0.0007	±0.0007	±0.0007
Effect on Output – %RO MAX	°F	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008
	°C	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015
ELECTRICAL						
Rated Output – mV/V (Nominal)		2.0	4.0	4.0	4.0	4.0
Excitation Voltage – VDC MAX		20	20	20	20	20
Bridge Resistance – Ohm (Nominal)		350	350	350	350	350
Zero Balance – %RO		±1.0	±1.0	±1.0	±1.0	±1.0
Insulation Resistance – Megohm		5000	5000	5000	5000	5000
MECHANICAL						
Safe Overload – %CAP		±150	±150	±150	±150	±150
Deflection @ RO	in	0.002	0.004	0.004	0.006	0.012
	mm	0.05	0.10	0.10	0.15	0.20
Base – P/N (Ref) (Metric)		B101 (m)	B102 (m)	B103 (m)	B112 (m)	B105 (m)
Natural Frequency – kHz		2.7, 3.5, 4.9, 7.0, 8.5	4.7, 6.6	4.6, 5.0	4.0	3.5
Weight	lbs	3.3	7.3	21.5	52	146
	kg	1.5	3.3	9.8	24	66
Calibration		Tension & Compression				
Material		Aluminum	Alloy Steel			

OPTIONS

- Compression overload protection
- Connector protection
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- CU.S.tom calibration
- Multiple bridge
- Special threads
- Dual diaphragm
- Special Temperature range
- Cable length
- Add connector to cable

CONNECTOR OPTIONS

- Integral cable 10ft (3m)
- PT02E-10-6P bayonet connector
- PC04E-10-6P screw-type connector

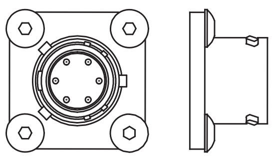
ACCESSORIES

- Mating connector
- Mating cable
- Instrumentation
- Loading hardware

1100 ULTRA PRECISION LOAD CELL (U.S. & METRIC)

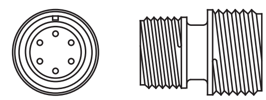
BAYONET CONNECTOR

Model 1120ACK-50K (Shown)



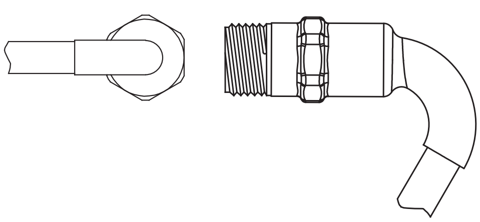
SCREW TYPE CONNECTOR

Model 1120AF-50K (Shown)



INTEGRAL 10FT CABLE CONNECTOR

Model 1120AJ-50K (Shown)



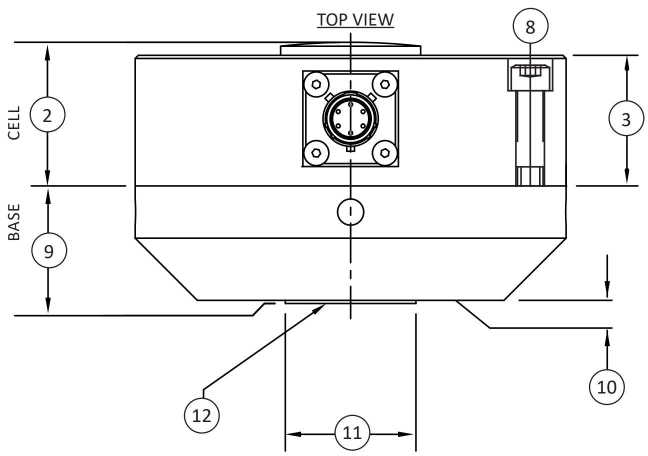
FORCE MEASUREMENT SOLUTIONS.

1101 ULTRA PRECISION COMPRESSION ONLY LOAD CELL (U.S. & METRIC)

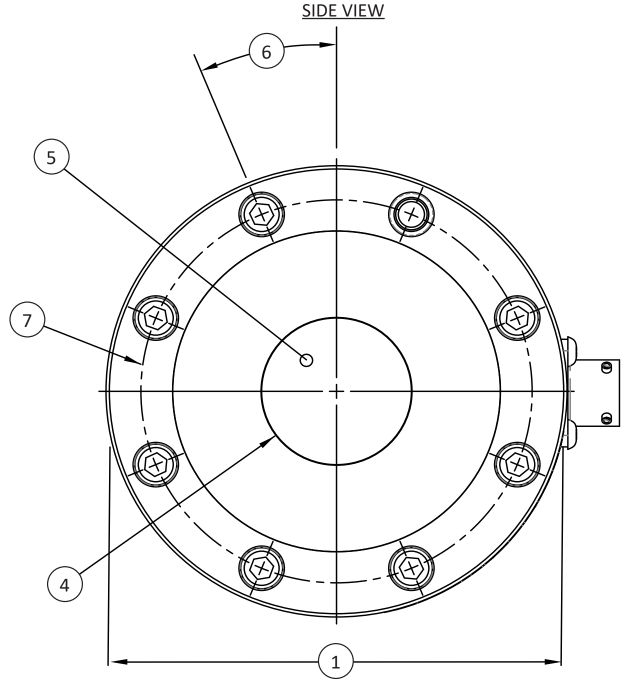
FEATURES & BENEFITS

- Capacities from 1K to 50K lbf (5 to 250 kN)
- Proprietary Interface Temperature compensated strain gages
- Performance to 0.02%
- High output - to 4 mV/V
- Eccentric load compensated
- Low deflection
- 0.0008%/°F (0.0015%/°C) temp. effect on output
- Shunt calibration
- High precision base included
- BaroMetric compensation

TOP VIEW



SIDE VIEW



STANDARD CONFIGURATION

Model 1121BAY-50K (Shown)

Dimensions

See Drawing	MODEL			
	1111		1121	
	CAPACITY			
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	1K, 2K, 5K, 10K	5, 10, 25, 50	25K, 50K	100, 250
	in	mm	in	mm
(1)	Ø4.13	Ø104.8	Ø6.06	Ø153.9
(2)	1.38	34.9	1.75	44.5
(3)	1.25	31.7	1.63	41.4
(4)	Ø1.34	Ø34.0	Ø2.65	Ø67.3
(5)	SR 6.00	SR 152.4	SR 8.00	SR 203.2
(6)	22.5°	22.5°	15.0°	15.0°
(7)	Ø3.50	Ø88.9	Ø5.13	Ø130.3
(8)	8 Places		12 Places	
(9)	1.13	28.7	1.75	44.5
(10)	0.03	0.8	0.03	0.8
(11)	Ø 1.25	Ø 31.8	Ø 2.25	Ø 57.2
(12)	⅝-18 UNF-3B ↧0.87	M-16 X 2-4H ↧22.1	1 ¼-12 UNF-3B ↧1.40	M33 X 2-4H ↧35.6

1101 ULTRA PRECISION COMPRESSION ONLY LOAD CELL (U.S. & METRIC)

Specifications

PARAMETERS			MODEL		
			1111	1111	1121
			CAPACITY		
Measuring Range	U.S. (lbf)		1K, 2K	5K, 10K	25K, 50K
	Metric (kN)		5, 10	25, 50	100, 250
ACCURACY – (MAX ERROR)					
Static Error Band – %FS			±0.02	±0.03	±0.03
Nonlinearity – %FS			±0.03	±0.04	±0.04
Hysteresis – %FS			±0.02	±0.04	±0.04
Nonrepeatability – %RO			±0.01	±0.01	±0.01
Creep, in 20 min – %			±0.025	±0.025	±0.025
Side Load Sensitivity – %			±0.1	±0.1	±0.1
Eccentric Load Sensitivity – % / in			±0.1	±0.1	±0.1
TEMPERATURE					
Compensated Range		°F	+15 to +115	+15 to +115	+15 to +115
		°C	-10 to +45	-10 to +45	-10 to +45
Operating Range		°F	-65 to +200	-65 to +200	-65 to +200
		°C	-55 to +90	-55 to +90	-55 to +90
Effect on Zero – %RO MAX		°F	±0.0004	±0.0004	±0.0004
		°C	±0.0007	±0.0007	±0.0007
Effect on Output – %RO MAX		°F	±0.0008	±0.0008	±0.0008
		°C	±0.0015	±0.0015	±0.0015
ELECTRICAL					
Rated Output – mV/V (Nominal)			2.0	4.0	4.0
Excitation Voltage – VDC MAX			20	20	20
Bridge Resistance – Ohm (Nominal)			350	350	350
Zero Balance – % RO			±1.0	±1.0	±1.0
Insulation Resistance – Megohm			5000	5000	5000
MECHANICAL					
Safe Overload – %CAP			±150	±150	±150
Deflection @ RO		in	0.002	0.004	0.004
		mm	0.05	0.10	0.10
Base Part Number (Ref)			B101	B102	B103
Natural Frequency – kHz			4.5, 6.4	4.3, 6.1	4.1, 4.6
Weight		lbs	3.3	7.3	21.5
		kg	1.5	3.3	9.8
Calibration			Compression		
Material			Tool steel		

OPTIONS

- Connector protection
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- CU.S.tom calibration
- Multiple bridge
- Special threads
- Dual diaphragm
- Special Temperature range
- Cable length
- Add connector to cable

CONNECTOR OPTIONS

- Integral cable 10 ft (3.0 m)
- PT02E-10-6P bayonet connector
- PC04E-10-6P screw-type connector

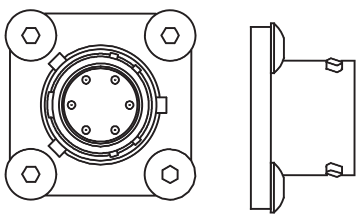
ACCESSORIES

- Mating connector
- Mating cable
- Instrumentation
- Loading hardware

1101 ULTRA PRECISION COMPRESSION ONLY LOAD CELL (U.S. & METRIC)

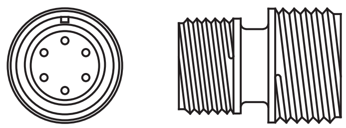
BAYONET CONNECTOR

Model 1121BAY-50K (Shown)



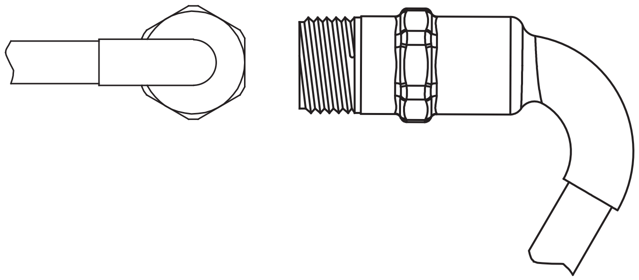
SCREW TYPE CONNECTOR

Model 1121HL-50K (Shown)



INTEGRAL 10FT CABLE CONNECTOR

Model 1121EX-50K (Shown)



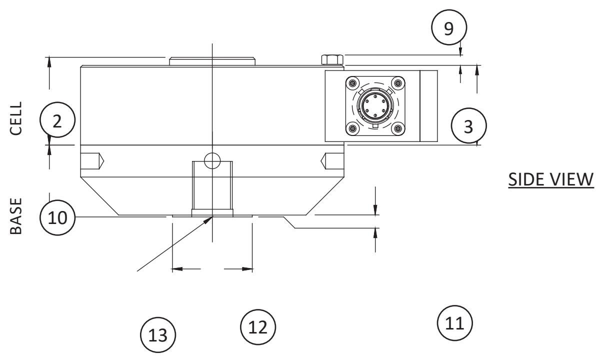
1200 STANDARD LOAD CELL (U.S. & METRIC)

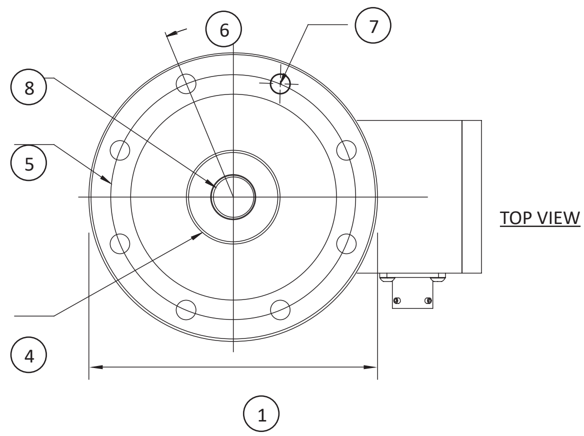
FEATURES & BENEFITS

- Capacities from 300 to 100K lbf (1.5 to 450 kN)
- Proprietary Interface Temperature compensated strain gages
- Performance to 0.04%
- High output – to 4 mV/V
- Eccentric load compensated
- 0.0008%/°F (0.0015%/°C) temp. effect on output
- Low deflection
- Shunt calibration
- BaroMetric compensation
- Tension and compression
- Compact size

STANDARD CONFIGURATION

Model 1220ACK-50K (Shown)





Dimensions

See Drawing	MODEL					
	1210		1220		1232	
	CAPACITY					
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	300, 500, 1K, 2K, 5K, 10K,	1.5, 2.5, 5, 10, 25, 50	25K, 50K	100, 250	100K	450
	in	mm	in	mm	in	mm
(1)	Ø4.13	Ø104.8	Ø6.06	Ø153.9	Ø8.00	Ø203.2
(2)	1.38	34.9	1.75	44.5	2.50	63.5
(3)	1.25	31.7	1.63	41.4	2.25	57.2
(4)	Ø1.34	Ø34.0	Ø2.65	Ø67.3	Ø3.76	Ø95.2
(5)	Ø3.50	Ø88.9	Ø5.13	Ø130.3	Ø6.50	Ø165.1
(6)	22.5°	22.5°	15.0°	15.0°	11.25°	11.25°
(7)	Ø0.28	Ø7.1	Ø0.41	Ø10.4	Ø0.53	Ø13.5
	8 places		12 places		16 places	
(8)	⅝-18 UNF-3B ↧ 1.12	M16 x 2-4H ↧ 28.4	1 ¼-12 UNF-3B ↧ 1.40	M33 x 2-4H ↧ 35.6	1 ¾-12 UN-3B ↧ 2.15	M42 x 2-4H ↧ 54.6
(9)	0.20	5.10	0.30	7.60	0.40	10.2
(10)	1.13	28.6	1.75	44.5	2.00	50.8
(11)	0.03	0.8	0.03	0.8	0.03	0.8
(12)	Ø1.25	Ø31.8	Ø2.25	Ø57.2	Ø3.00	Ø76.2
(13)	⅝-18 UNF-3B ↧ 0.87	M16 x 2-4H ↧ 22.1	1 ¼-12 UNF-3B ↧ 1.40	M33 x 2-4H ↧ 35.6	1 ¾-12 UNF-3B ↧ 1.75	M42 x 2-4H ↧ 44.5

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1200 STANDARD LOAD CELL (U.S. & METRIC)

Specifications

PARAMETERS			MODEL			
			1210	1210	1220	1232
			CAPACITY			
Measuring Range	U.S. (lbf)		300, 500 1K, 2K	5K, 10K	25K, 50K	100K
	Metric (kN)		1.5, 2.5, 5, 10	25, 50	100, 250	450
ACCURACY – (MAX ERROR)						
Static Error Band – %FS			±0.04	±0.04	±0.04	±0.06
Nonlinearity – %FS			±0.04	±0.04	±0.04	±0.05
Hysteresis – %FS			±0.03	±0.04	±0.05	±0.06
Nonrepeatability – %RO			±0.01	±0.01	±0.01	±0.01
Creep, in 20 min – %			±0.025	±0.025	±0.025	±0.025
Side Load Sensitivity – %			±0.25	±0.25	±0.25	±0.25
Eccentric Load Sensitivity – % / in			±0.25	±0.25	±0.25	±0.25
TEMPERATURE						
Compensated Range		°F	+15 to +115	+15 to +115	+15 to +115	+15 to +115
		°C	-10 to +45	-10 to +45	-10 to +45	-10 to +45
Operating Range		°F	-65 to +200	-65 to +200	-65 to +200	-65 to +200
		°C	-55 to +90	-55 to +90	-55 to +90	-55 to +90
Effect on Zero – %RO MAX		°F	±0.0008	±0.0008	±0.0008	±0.0008
		°C	±0.0015	±0.0015	±0.0015	±0.0015
Effect on Output – %RO / °F MAX		°F	±0.0008	±0.0008	±0.0008	±0.0008
		°C	±0.0015	±0.0015	±0.0015	±0.0015
ELECTRICAL						
Rated Output – mV/V (Nominal)			2.0	4.0	4.0	4.0
Excitation Voltage – VDC MAX			20	20	20	20
Bridge Resistance – Ohm (Nominal)			350	350	350	350
Zero Balance – %RO			±1.0	±1.0	±1.0	±1.0
Insulation Resistance – Megohm			5000	5000	5000	5000
MECHANICAL						
Safe Overload – %CAP			±150	±150	±150	±150
Deflection @ RO		in	0.001	0.002	0.002	0.003
		mm	0.03	0.05	0.05	0.08
Optional Base – P/N (Metric)			B101 (M)	B102 (M)	B103 (M)	B112 (M)
Natural Frequency – kHz			3.9, 5.0, 6.9, 9.8	6.6, 9.4	6.5, 7.0	5.8
Weight		lbs	1.5	3.3	9.5	26
		kg	0.7	1.5	4.3	11.8
Calibration			Tension & Compression			
Material			Aluminum	Alloy Steel		

OPTIONS

- Base (recommended)
- Connector protection
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- CU.S.tom calibration
- Multiple bridge
- Special threads
- Dual diaphragm
- Special Temperature range
- Cable length
- Add connector to cable

CONNECTOR OPTIONS

- Integral cable 10 ft (3 m)
- PT02E-10-6P bayonet connector
- PC04E-10-6P screw-type connector

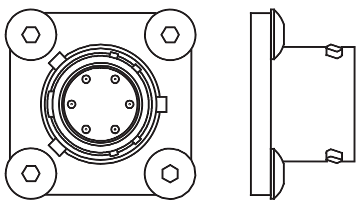
ACCESSORIES

- Mating connector
- Mating cable
- Instrumentation
- Loading hardware

1200 STANDARD LOAD CELL (U.S. & METRIC)

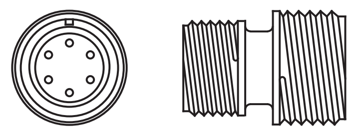
BAYONET CONNECTOR

Model 1220ACK-50K



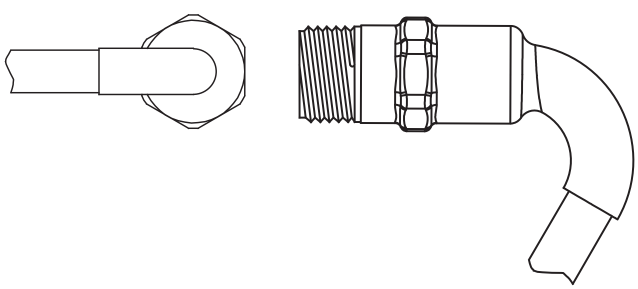
SCREW TYPE CONNECTOR

Model 1220AF-50K

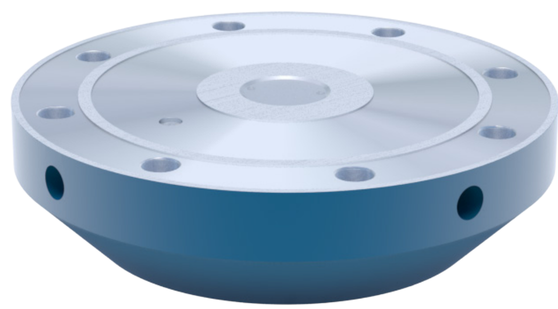


INTEGRAL 10 FT. CABLE CONNECTOR

Model 1220AJ-50K



BASE



Model B1XX

1200 STANDARD HIGH CAPACITY LOAD CELL (U.S. & METRIC)

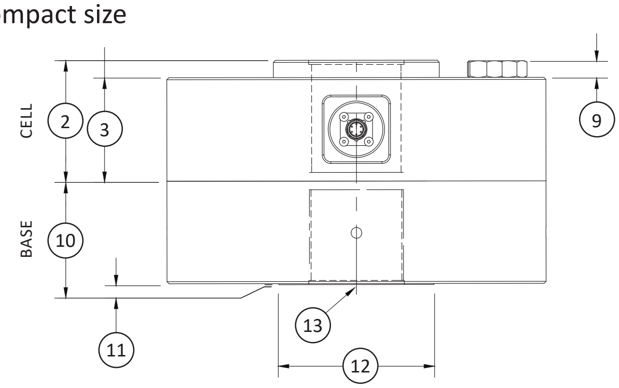
FEATURES & BENEFITS

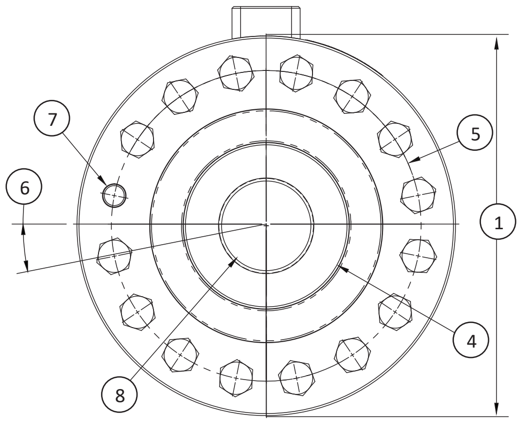
- Capacities from 200K to 2000K lbf (900 to 9000 kN)
- Proprietary Interface Temperature
- Compensated strain gages
- Performance to 0.07%
- High output – to 4 mV/V
- Eccentric load compensated
- 0.0008%/°F (0.0015%/°C) temp. effect on output
- Low deflection
- Shunt calibration
- BaroMetric compensation
- Tension and compression
- Compact size

STANDARD CONFIGURATION

Model 1240ACK-200K (shown)

SIDE VIEW





TOP VIEW

Dimensions

See Drawing	MODEL											
	1240		1244		1252		1260		1280		1290	
	CAPACITY											
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	200K	900	270K	1200	400K	1800	600K	2700	1000K	4500	2000K	9000
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
(1)	Ø11.0	Ø279.0	Ø11.0	Ø279.0	Ø12.0	Ø304.8	Ø15.5	Ø393.7	Ø20.50	Ø520.7	Ø26.00	Ø660.4
(2)	3.50	88.9	4.00	101.6	4.50	114.3	5.50	139.7	6.25	158.8	7.75	196.9
(3)	3.00	76.2	3.25	82.6	4.25	108.0	5.00	127.0	6.00	152.4	7.50	190.5
(4)	Ø4.81	Ø122.2	Ø4.81	Ø122.2	Ø6.18	Ø156.8	Ø7.73	Ø196.3	Ø10.55	Ø267.9	Ø13.79	Ø350.3
(5)	Ø9.00	Ø228.6	Ø8.75	Ø222.2	Ø9.88	Ø250.8	Ø12.68	Ø322.1	Ø16.5	Ø419.1	Ø20.50	Ø520.7
(6)	11.25°	11.25°	11.25°	11.25°	9.00°	9.00°	7.50°	7.50°	6.43°	6.43°	5.63°	5.63°
(7)	Ø0.65	Ø16.5	Ø0.79	20.1	Ø0.79	Ø21.0	Ø0.94	Ø23.9	Ø1.06	Ø27.0	Ø1.31	Ø33.3
	16 places		16 places		20 places		24 places		28 places		32 places	
(8)	2 ¾-8 UN-3B ↧2.75	M72 X 2-4H ↧70	2 ¾-8 UN-3B ↧3.75	M72 X 2-4H ↧95.3	3 ½-8 UN-3B ↧4.13	M90 X 3-4H ↧104.9	4 ¼-8 UN-3B ↧4.25	M120 X 4-4H ↧108	6.00-8 UN-3B ↧5.63	M150 X 4-4H ↧143	8.00-8 UN-3B ↧7.00	M200 X 4-4H ↧178
(9)	0.50	12.7	0.58	14.7	0.59	20.0	0.69	12.5	1.00	25.4	1.25	31.3
(10)	3.00	76.2	4.00	101.6	4.50	114.3	5.00	127.0	7.00	177.8	9.00	228.6
(11)	0.03	0.80	0.03	0.80	0.03	0.80	0.03	0.80	0.10	2.5	0.10	2.5
(12)	Ø4.50	Ø114.3	Ø4.50	Ø114.3	Ø6.00	Ø152.4	Ø7.75	Ø196.9	Ø10.55	Ø267.9	Ø14.00	Ø355.6
(13)	2 ¾-8 UNF-3B ↧2.75	M72 X 2-4H ↧69.8	2 ¾-8 UNF-3B ↧2.75	M72 X 2-4H ↧69.8	3 ½-8 UN-3B ↧3.75	M90 X 3-4H ↧95.3	4 ¼-8 UN-3B ↧4.25	M120 X 4-4H ↧108	6.00-8 UN-3B ↧6.38	M150 X 4-4H ↧162	8.00-8 UN-3B ↧7.25	M200 X 4-4H ↧184

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1200 STANDARD HIGH CAPACITY LOAD CELL (U.S. & METRIC)

Specifications

PARAMETERS			MODEL					
			1240	1244	1252	1260	1280	1290
			CAPACITY					
Measuring Range	U.S. (lbf)		200K	270K	400K	600K	1000K	2000K
	Metric (kN)		900	1200	1800	2700	4500	9000
ACCURACY – (MAX ERROR)								
Static Error Band – %FS			±0.07	±0.07	±0.10	±0.12	±0.15	±0.20
Nonlinearity – %FS			±0.07	±0.08	±0.10	±0.12	±0.15	±0.20
Hysteresis – %FS			±0.07	±0.08	±0.10	±0.12	±0.15	±0.20
Nonrepeatability – %RO			±0.01	±0.02	±0.02	±0.02	±0.02	±0.02
Creep, in 20 min – %			±0.025	±0.025	±0.025	±0.025	±0.025	±0.025
Side Load Sensitivity – %			±0.25	±0.25	±0.25	±0.25	±0.25	±0.25
Eccentric Load Sensitivity – % / in			±0.25	±0.25	±0.25	±0.25	±0.25	±0.50
TEMPERATURE								
Compensated Range		°F	+15 to +115	+15 to +115	+15 to +115	+15 to +115	+15 to +115	+15 to +115
		°C	-10 to +45	-10 to +45	-10 to +45	-10 to +45	-10 to +45	-10 to +45
Operating Range		°F	-65 to +200	-65 to +200	-65 to +200	-65 to +200	-65 to +200	-65 to +200
		°C	-55 to +90	-55 to +90	-55 to +90	-55 to +90	-55 to +90	-55 to +90
Effect on Zero – %RO MAX		°F	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008
		°C	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015
Effect on Output – %RO MAX		°F	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008
		°C	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015
ELECTRICAL								
Rated Output – mV/V (Nominal)			4.0	4.0	4.0	4.0	4.0	4.0**
Excitation Voltage – VDC MAX			20	20	20	20	20	20
Bridge Resistance – Ohm (Nominal)			350	350	350	350	350	350
Zero Balance – %RO			±1.0	±1.0	±1.0	±1.0	±1.0	±1.0
Insulation Resistance – Megohm			5000	5000	5000	5000	5000	5000
MECHANICAL								
Safe Overload – %CAP			±150	±150	±150	±150	±150	±150
Deflection @ RO – w/Base		in	0.012	0.006	0.007	0.008	0.008	0.010
		mm	0.30	0.15	0.18	0.2	0.2	0.25
Optional Base – P/N (Metric)			B105 (M)	B116 (M)	B121 (M)	B122 (M)	B123 (M)	B125 (M)
Natural Frequency – kHz			4.9	5.0	5.5	5.5	5.5	5.5
Weight		lbs	68	70	100	200	450	860
		kg	30.9	31.8	45	90	205	390
Calibration			Tension & Compression					
Material			Alloy Steel					

***Calibrated to 1000K only*

OPTIONS

- Base (recommended)
- Multiple bridge
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- Special Temperature range

CONNECTOR OPTIONS

- PT02E-10-6P Bayonet Connector
- PC04E-10-6P Screw-Type Connector

ACCESSORIES

- Mating connector
- Mating cable
- Instrumentation
- Loading hardware

FORCE MEASUREMENT SOLUTIONS

WTS 1200 STANDARD PRECISION LOWPROFILE™ WIRELESS LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 300 to 100K lbf (1.5 to 450 kN)
- Proprietary Interface Temperature compensated strain gages
- Performance to 0.0425%
- 2.4 GHZ transceiver
- Eccentric load compensated
- Low deflection
- BaroMetric compensation
- Tension and compression
- Compact size

OPTIONS

- Base (recommended)
- Standardized output
- CU.S.tom calibration
- Multiple bridge
- Special threads
- Dual diaphragm

COMPATIBLE WITH

Model WTS-BS-1-HA (Shown)

STANDARD CONFIGURATION

Model 1220WTS-50K (Shown)

TRANSCEIVER Specifications

MEASUREMENT SPECIFICATIONS		
Strain Gauge Excitation System		4-wire
Strain Gauge Excitation – VDC		3
Strain Gauge Resistance (min) – Ω		85
Strain Gauge Sensitivity (max) – mV/V		±4.5
Offset Temperature Stability (max) – ppm/°C		4
Gain Temperature Stability (max) – ppm/°C		5
Nonlinearity Before Linearization (max) – ppm of FR		25
Internal Resolution/Bits		16,000,000 / 24
Noise Free Resolution at 1 Sample Per Second		400,000 / 18.75
Transmission Rates – ms to day		From 5 to 1
BATTERY LIFE		
Battery		2 x AAA Alkaline
Battery Life – hrs		300 typically
RADIO		
Radio Type		License exempt transceiver
Radio Frequency – GHz		2.4
Transmit Power – mW		10
Range	m	Up to 610
	ft	Up to 2,000
ENVIRONMENTAL		
Operating Temperature Range	°C	-20 to 55
	°F	-4 to 131
Storage Temperature Range (no batteries)	°C	-40 to 85
	°F	-40 to 185
Maximum Humidity – %		95 non-condensing
IP Rating (WTS-AM-1 & WTS-AM-1-D)		IP67/Nema4
Telemetry HoU.S.ing		Polyamide resin
Material		Heat Treated Steel or Stainless Steel

WTS 1200 STANDARD PRECISION LOWPROFILE™ WIRELESS LOAD CELL (U.S. & METRIC)

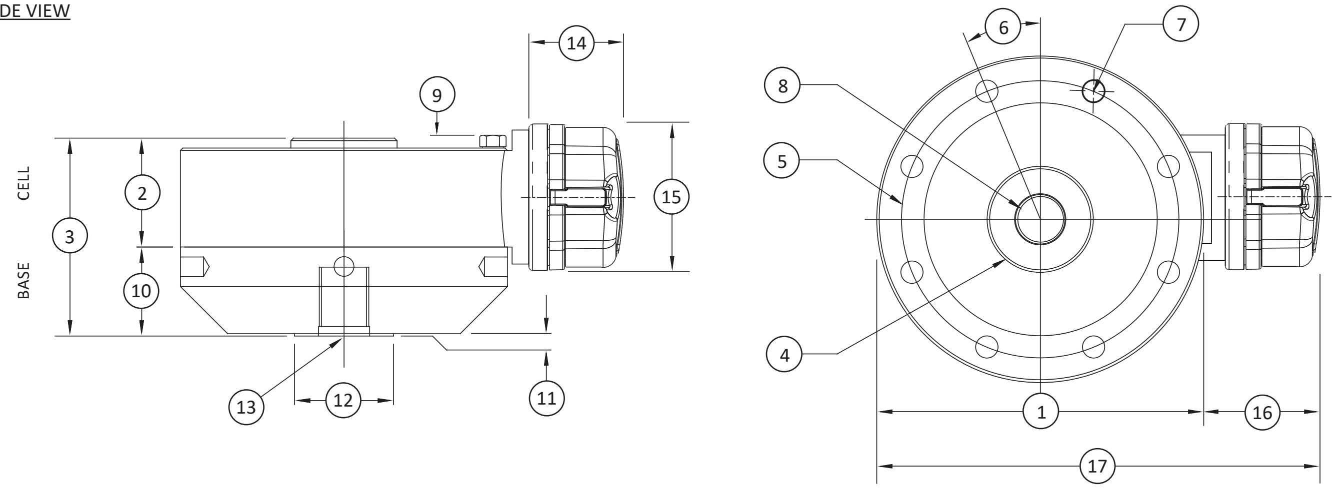
LOAD CELL Specifications

PARAMETERS			MODEL			
			1210	1210	1220	1232
			CAPACITY			
Measuring Range	U.S. (lbf)		300, 500 1K, 2K	5K, 10K	25K, 50K	100K
	Metric (kN)		1.5, 2.5, 5, 10	25, 50	100, 250	450
ACCURACY – (MAX ERROR)						
Static Error Band – %FS			±0.04	±0.04	±0.04	±0.06
Nonlinearity – %FS			±0.04	±0.04	±0.04	±0.05
Hysteresis – %FS			±0.03	±0.04	±0.05	±0.06
Nonrepeatability – %RO			±0.01	±0.01	±0.01	±0.01
Creep, in 20 min – %			±0.025	±0.025	±0.025	±0.025
Side Load Sensitivity – %			±0.25	±0.25	±0.25	±0.25
Eccentric Load Sensitivity – % / in			±0.25	±0.25	±0.25	±0.25
TEMPERATURE						
Compensated Range		°F	+15 to +115	+15 to +115	+15 to +115	+15 to +115
		°C	-10 to +45	-10 to +45	-10 to +45	-10 to +45
Operating Range *		°F	* Please reference Transceiver Operating Temperature Range			
		°C				
Effect on Zero – %RO MAX		°F	±0.0008	±0.0008	±0.0008	±0.0008
		°C	±0.0015	±0.0015	±0.0015	±0.0015
Effect on Output – %RO / °F MAX		°F	±0.0008	±0.0008	±0.0008	±0.0008
		°C	±0.0015	±0.0015	±0.0015	±0.0015
ELECTRICAL						
Rated Output – mV/V (Nominal)			2.0	4.0	4.0	4.0
Excitation Voltage – VDC MAX			20	20	20	20
Bridge Resistance – Ohm (Nominal)			350	350	350	350
Zero Balance – %RO			±1.0	±1.0	±1.0	±1.0
Insulation Resistance – Megohm			5000	5000	5000	5000
MECHANICAL						
Safe Overload – %CAP			±150	±150	±150	±150
Deflection @ RO		in	0.001	0.002	0.002	0.003
		mm	0.03	0.05	0.05	0.08
Optional Base – P/N (Metric)			B101 (M)	B102 (M)	B103 (M)	B112 (M)
Natural Frequency – kHz			3.9, 5.0, 6.9, 9.8	6.6, 9.4	6.5, 7.0	5.8
Weight		lbs	1.5	3.3	9.5	26
		kg	0.7	1.5	4.3	11.8
Calibration			Tension & Compression			
Material			Aluminum	Alloy Steel		

WTS 1200 STANDARD PRECISION LOWPROFILE™ WIRELESS LOAD CELL (U.S. & METRIC)

SIDE VIEW

TOP VIEW



Dimensions

See Drawing	MODEL					
	1210		1220		1232	
	CAPACITY					
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	300, 500, 1K, 2K, 5K, 10K,	1.5, 2.5, 5, 10, 25, 50	25K, 50K	100, 250	100K	450
	in	mm	in	mm	in	mm
(1)	Ø4.13	Ø104.8	Ø6.06	Ø153.9	Ø8.00	Ø203.2
(2)	1.38	34.9	1.75	44.5	2.50	63.5
(3)	2.51	63.5	3.5	89.0	4.5	114.3
(4)	Ø1.34	Ø34.0	Ø2.65	Ø67.3	Ø3.76	Ø95.2
(5)	Ø3.50	Ø88.9	Ø5.13	Ø130.3	Ø6.50	Ø165.1
(6)	22.5°	22.5°	15.0°	15.0°	11.25°	11.25°
(7)	Ø0.28	Ø7.1	Ø0.41	Ø10.4	Ø0.53	Ø13.5
	8 places		12 places		16 places	
(8)	⅝-18 UNF-3B ↧ 1.12	M16 x 2-4H ↧ 28.4	1 ¼-12 UNF-3B ↧ 1.40	M33 x 2-4H ↧ 35.6	1 ¾-12 UN-3B ↧ 2.15	M42 x 2-4H ↧ 54.6
(9)	0.20	5.10	0.30	7.60	0.40	10.2
(10)	1.13	28.6	1.75	44.5	2.00	50.8
(11)	0.03	0.8	0.03	0.8	0.03	0.8
(12)	Ø1.25	Ø31.8	Ø2.25	Ø57.2	Ø3.00	Ø76.2
(13)	⅝-18 UNF-3B ↧ 0.87	M16 x 2-4H ↧ 22.1	1 ¼-12 UNF-3B ↧ 1.40	M33 x 2-4H ↧ 35.6	1 ¾-12 UNF-3B ↧ 1.75	M42 x 2-4H ↧ 44.5
(14)	2.0	50.5	2.0	50.5	2.0	50.5
(15)	Ø3.1	Ø78	Ø3.1	Ø78	Ø3.1	Ø78
(16)	2.5	63.5	2.5	63.5	2.5	63.5
(17)	6.63	168.4	8.56	217.4	10.5	266.7

1200 AND 1201 SERIES 3-WIRE AMPLIFIED LOAD CELL UNIVERSAL OR COMPRESSION-ONLY (U.S. & METRIC)

FEATURES & BENEFITS

Why the Interface model 1200 and 1201 Standard 3-Wire Amplified:

- Load Cell is the best in class:
- Proprietary Interface Temperature
- compensated strain gages
- Eccentric load compensated
- Low deflection
- Shunt calibration
- Tension and compression
- Compact size
- 3-wire internal amp choice of 4-20 mA, ±5V, ±10V, 0-5V, 0-10V

STANDARD CONFIGURATION

Model 1210ACK-5K-1 (Shown)

OPTIONS

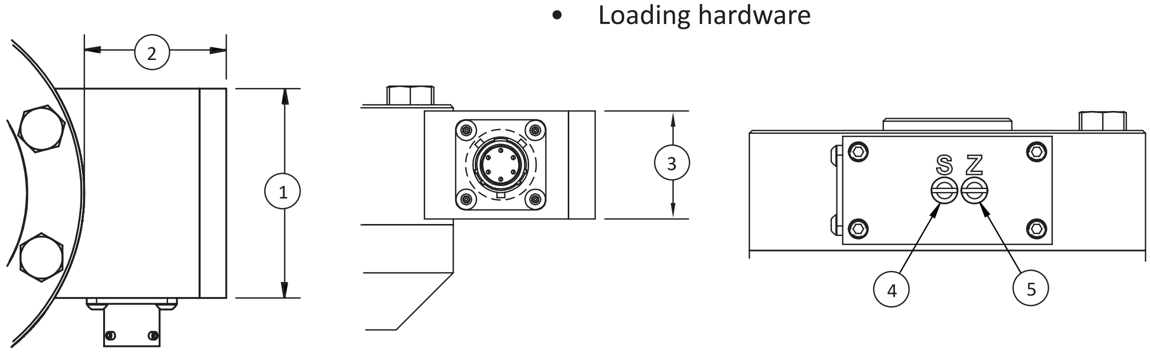
- Base (recommended)
- CU.S.tom calibration
- Multiple bridge
- Special threads
- Dual diaphragm

CONNECTOR OPTIONS

- PT02E-10-6P bayonet connector

ACCESSORIES

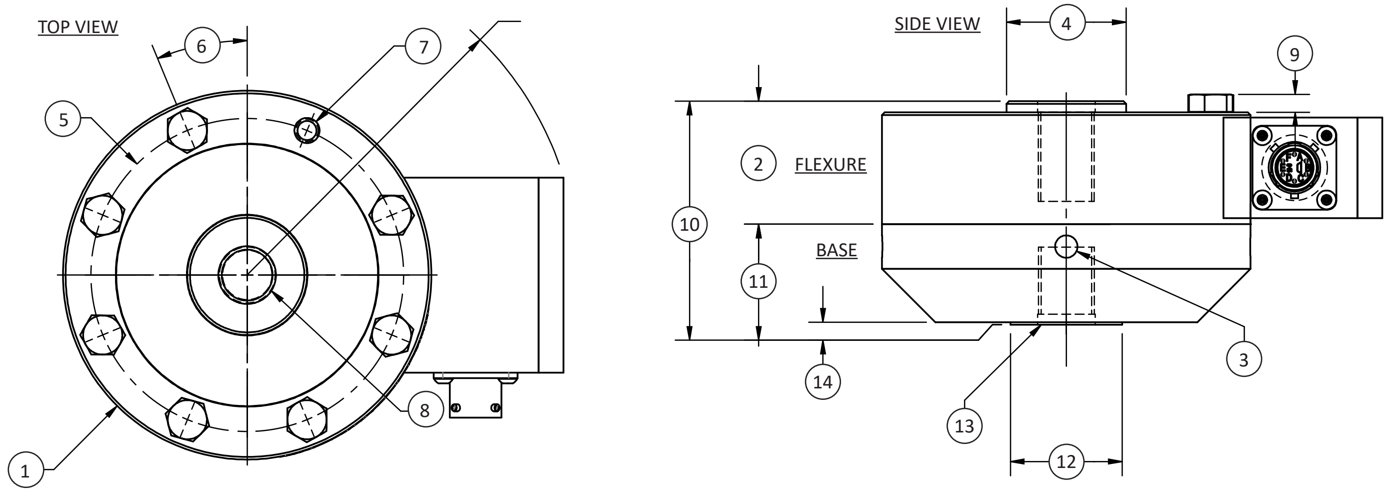
- Mating connector
- Mating cable
- Instrumentation
- Loading hardware



Dimensions

See Drawing	AMPLIFIER HOU.S.ING	
	ALL MODELS	
	ALL CAPACITIES	
	in	mm
(1)	2.18	55.4
(2)	1.48	37.6
(3)	1.13	28.6
(4)	Span AdjU.S.tment Cover Screw	
(5)	Zero AdjU.S.tment Cover Screw	

1200 AND 1201 SERIES 3-WIRE AMPLIFIED LOAD CELL UNIVERSAL OR COMPRESSION-ONLY (U.S. & METRIC)

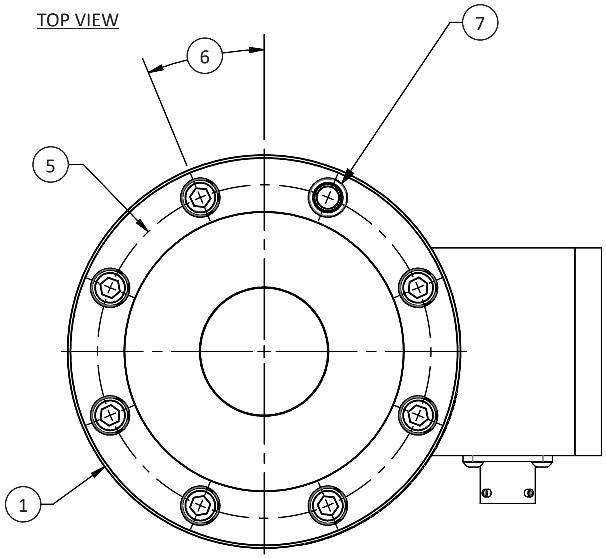


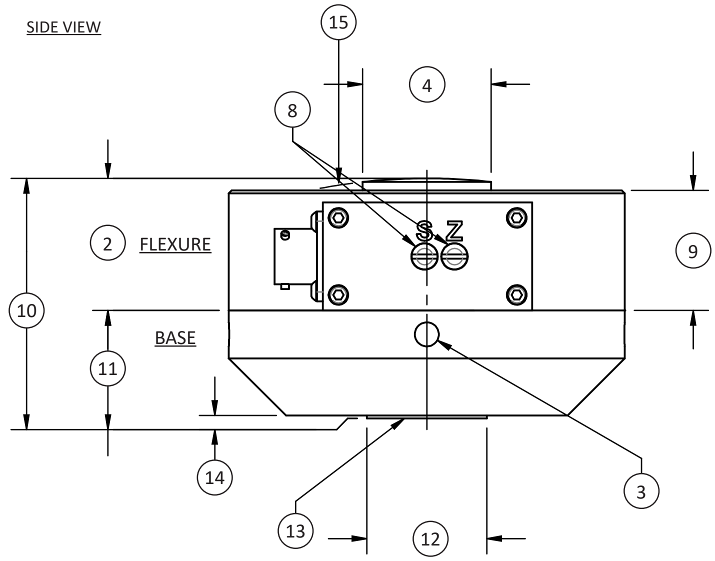
Dimensions

See Drawing	MODEL					
	1210		1220		1232	
	CAPACITY					
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	300, 500, 1K, 2K, 5K, 10K,	1.5, 2.5, 5, 10, 25, 50	25K, 50K	100, 250	100K	450
	in	mm	in	mm	in	mm
(1)	Ø4.12	Ø104.7	Ø6.06	Ø153.9	Ø8.00	Ø203.2
(2)	1.38	34.9	1.75	44.5	2.50	63.5
(3)	4 x Ø0.25 ↧ 0.29	4 x Ø6.4 ↧ 7.4	4 x Ø0.31 ↧ 0.31 ES 90°	4 x Ø7.9 ↧ 7.9 ES 90°	4 x Ø0.31 ↧ 0.31 ES 90°	4 x Ø7.9 ↧ 7.9 ES 90°
(4)	Ø1.34	Ø34.0	Ø2.41	Ø61.2	Ø3.76	Ø95.5
(5)	Ø3.50	Ø88.9	Ø5.125	Ø130.18	Ø6.50	Ø165.1
(6)	22.5°		15.0°		11.25°	
(7)	8 x Ø0.28 THRU	8 x Ø7.1 THRU	12 x Ø0.41 THRU	12 x Ø10.3 THRU	16 x Ø0.53 THRU	16 x Ø13.5 THRU
(8)	⅝-18 UNF-3B ↧ 1.12 ⌴ Ø⅝ ↧ 0.12	M16 X 2-4H ↧ 28.6 ⌴ Ø16.4 ↧ 3.05	1⅛-12 UNF-3B ↧ 1.40 ⌴ Ø1.27 ↧ 0.12	M33 X 2-4H ↧ 35.6 ⌴ Ø33.5 ↧ 3.0	1¾-12 UNF-3B ↧ 2.15 ⌴ Ø1.77 ↧ 0.12	M42 X 2-4H ↧ 54.6 ⌴ Ø42.5 ↧ 3.0
(9)	0.20	5.1	0.3	7.6	0.4	10.2
(10)	2.50	63.5	3.5	88.9	4.5	114.3
(11)	1.13	28.6	1.75	44.5	2.00	50.8
(12)	1.25	31.8	Ø2.25	Ø57.2	Ø3.00	Ø76.2
(13)	⅝-18 UNF-3B ↧ 0.87 ⌴ Ø⅝ ↧ 0.12	M16 X 2-4H ↧ 22.1 ⌴ Ø16.4 ↧ 3.05	1¼-12 UNF-3B ↧ 1.40 ⌴ Ø1.27 ↧ 0.12	M33 X 2-4H ↧ 35.6 ⌴ Ø33.5 ↧ 3	1¾-12 UNF-3B ↧ 1.75 ⌴ Ø1.77 ↧ 0.12	M42 X 2-4H ↧ 44.5 ⌴ Ø42.5 ↧ 3.0
(14)	0.03	0.8	0.03	0.8	0.03	0.8

FORCE MEASUREMENT SOLUTIONS.

1200 AND 1201 SERIES 3-WIRE AMPLIFIED LOAD CELL UNIVERSAL OR COMPRESSION-ONLY (U.S. & METRIC)





Dimensions

See Drawing	MODEL							
	1211		1221		1231		1241	
	CAPACITY							
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	1K, 2K, 5K, 10K	5, 10, 25, 50	25K, 50K	125, 250	100k	450	200K	900
	in	mm	in	mm	in	mm	in	mm
(1)	Ø4.12	Ø104.7	Ø4.75	Ø120.6	Ø7.50	Ø190.4	Ø8.25	Ø209.5
(2)	1.38	34.9	1.75	44.5	2.25	57.2	3.25	82.6
(3)	4 x Ø0.25 ↧ 0.29	4 x Ø6.4 ↧ 7.4	4 x Ø0.31 ↧ 0.31	4 x Ø7.9 ↧ 7.9	4 x Ø0.31 ↧ 0.31	4 x Ø7.9 ↧ 7.9	4 X Ø0.31 ↧ 0.31	4 X Ø7.9 ↧ 7.9
(4)	Ø1.34	Ø34.0	Ø1.57	Ø39.9	Ø3.13	Ø79.4	Ø3.16	Ø80.3
(5)	Ø3.500	Ø88.90	Ø4.000	Ø101.60	Ø6.250	Ø158.75	Ø6.750	Ø171.45
(6)	22.5°		45.0°		15.0°		15.0°	
(7)	4 X Ø0.41 ↧ 0.25 ⌴ Ø0.28 THRU	4 X Ø10.3 ↧ 6.4 ⌴ Ø7.1 THRU	4 X Ø0.34 THRU Ø0.39 X 90°, NEAR SIDE	4 X Ø8.7 THRU Ø10.0 X 90°, NEAR SIDE	12 X Ø0.47 THRU ⌴ Ø0.69 ↧ 0.438	12 X Ø11.9 THRU ⌴ Ø17.5 ↧ 17.5	12 X Ø0.66 THRU ⌴ Ø1.00 ↧ 0.63	12 X Ø16.7 THRU ⌴ Ø25.4 ↧ 15.9
(8)	Span & Zero AdjU.S.tment Cover		Span & Zero AdjU.S.tment Cover		Span & Zero AdjU.S.tment Cover		Span & Zero AdjU.S.tment Cover	
(9)	1.25	31.8	1.63	41.3	2.00	50.8	3.00	76.2
(10)	2.50	63.5	3.00	76.3	4.25	108.0	5.75	146.1
(11)	1.13	28.6	1.25	31.8	2.00	50.8	2.50	63.5
(12)	Ø1.25	Ø31.8	2.00	50.8	Ø3.00	Ø76.2	3.00	76.2
(13)	Ø⅝-18 UNF-3B ↧ 0.87 ⌴ Ø13/20 ↧ 0.12	M16 x 2-4H ↧ 22.1 ⌴ Ø16.4 ↧ 3.0	Ø½-20 UNF-2B ↧ 0.88	M16 X 2-6H ↧ 22.4	Ø¾-12 UNF-3B ↧ 1.75 ⌴ Ø1.77 ↧ 0.12	M27 x 2-6H ↧ 44.5 ⌴ Ø45.0 ↧ 3.0	Ø¾-16 UNF-3B ↧ 1.50 ⌴ Ø0.77 ↧ 0.12	M27 x 2-6H ↧ 38.1
(14)	0.03	0.8	0.03	0.8	0.03	0.8	0.03	0.8
(15)	S R6.00	152.4	R6.00	152.4	R8.00	57.2	R12.00	304.8

1200 AND 1201 SERIES 3-WIRE AMPLIFIED LOAD CELL UNIVERSAL OR COMPRESSION-ONLY (U.S. & METRIC)

Specifications

PARAMETERS		MODEL			
UNIVERSAL		1210	1210	1220	1232
COMPRESSION-ONLY		1211**	1211	1221	1231
CAPACITY					
U.S. MODELS (lbf)		300, 500, 1K, 2K	5K, 10K	25K, 50K	100K
METRIC MODELS (kN)		1.5, 2.5, 5, 10	25, 50	100, 250	450
ACCURACY – (MAX ERROR)					
Static Error Band – %FS		±0.06	±0.07	±0.07	±0.07
Nonlinearity – %FS		±0.06	±0.07	±0.07	±0.07
Hysteresis – %FS		±0.03	±0.05	±0.06	±0.06
Nonrepeatability – %RO		±0.02	±0.02	±0.02	±0.02
Creep, in 20 min – %		±0.025	±0.025	±0.025	±0.025
Side Load Sensitivity – %		±0.25	±0.25	±0.25	±0.25
Eccentric Load Sensitivity – % / in		±0.25	±0.25	±0.25	±0.25
TEMPERATURE					
Compensated Range	°F	15 to 115	15 to 115	15 to 115	15 to 115
	°C	-10 to 45	-10 to 45	-10 to 45	-10 to 45
Operating Range	°F	-20 to 185	-20 to 185	-20 to 185	-20 to 185
	°C	-29 to 85	-29 to 85	-29 to 85	-29 to 85
Effect on Zero – %RO MAX	°F	±0.005	±0.003	±0.003	±0.003
	°C	±0.009	±0.005	±0.005	±0.005
Effect on Output – % MAX	°F	±0.005	±0.005	±0.005	±0.005
	°C	±0.009	±0.009	±0.009	±0.009
Electrical					
Rated Output		4-20 mA, ±5V, ±10V, 0-5V, 0-10V			
Supply Voltage – VDC MAX		12 to 28	12 to 28	12 to 28	12 to 28
Span AdjU.S.t Range – % RO		±10	±10	±10	±10
Zero AdjU.S.t Range – % RO		7	3.5	3.5	3.5
Insulation Resistance – Megohm		5000	5000	5000	5000
MECHANICAL					
Safe Overload – %CAP		±150	±150	±150	±150
Deflection @ RO	in	0.001	0.002	0.002	0.003
	mm	0.03	0.05	0.05	0.08
Optional Base – P/N (Metric)		B101 (M)	B102 (M)	B103 (M)	B112 (M)
Bandwidth Hz		200	200	200	200
Weight	lbf	1.5	3.3	9.5	26
	kg	0.7	1.5	4.3	11.8
Connector		PT02E-10-6P			
Calibration		Tension & Compression			
Material		Aluminum	Alloy steel		

1201 STANDARD LOAD CELL COMPRESSION-ONLY (U.S. & METRIC)

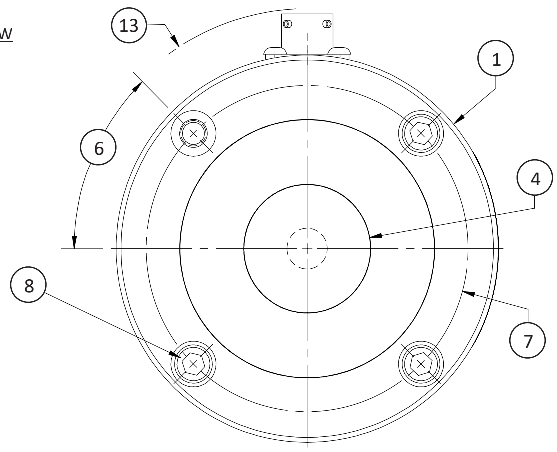
FEATURES & BENEFITS

- Capacities from 1K to 400K lbf (5 to 1800 kN)
- Performance to 0.03%
- High output – to 4 mV/V
- Eccentric load compensated
- 0.0008%/°F (0.0015%/°C) temp. effect on output
- Low deflection
- Shunt calibration
- BaroMetric compensation
- Compact size
- Counterbored mounting holes

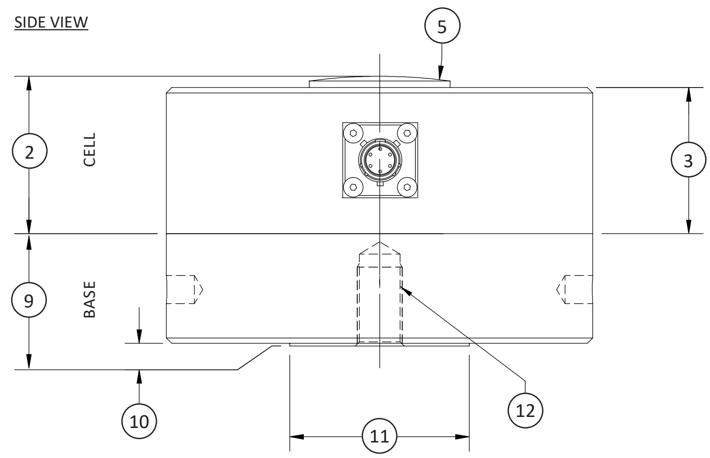
STANDARD CONFIGURATION

Model 1221BAY-50K (Shown without base)

TOP VIEW



SIDE VIEW



Dimensions

See Drawing	MODEL									
	1211		1221		1231		1241		1243	
	CAPACITY									
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	1K, 2K, 5K, 10K	5, 10, 25, 50	25K, 50K	125, 250	100k	450	200K	900	300K 400K	1350 1800
	in	mm	in	mm	in	mm	in	mm	in	mm
(1)	Ø4.13	Ø104.8	Ø4.75	Ø120.7	Ø7.50	Ø190.5	Ø8.25	Ø210	Ø11.00	Ø279.0
(2)	1.38	34.9	1.75	44.5	2.25	57.2	3.25	82.5	3.50	88.9
(3)	1.25	31.7	1.63	41.4	2.00	50.8	3.00	76.2	3.00	76.2
(4)	Ø1.34	Ø34.0	Ø1.57	Ø39.9	Ø3.13	Ø79.5	Ø3.16	Ø80.3	Ø4.81	Ø122.2
(5)	SR 6.00	SR 152.4	SR 6.00	SR 152.4	SR 8.00	SR 203.2	SR 12.00	SR 304.8	SR 18.00	SR 457.0
(6)	22.5°	22.5°	45.0°	45.0°	15.0°	15.0°	15.0°	15.0°	11.25°	11.25°
(7)	Ø3.50	Ø88.9	Ø4.00	Ø101.6	Ø6.25	Ø158.8	Ø6.75	Ø171.5	Ø9.00	Ø229.0
(8)	¼-28x1 ¼		5/16-24x1 ¾		7/16-20x2		⅝-18x3		⅝-18x3	
	8 places		4 places		12 places		12 places		16 places	
(9)	1.13	28.7	1.25	31.8	2.00	50.8	2.50	63.5	3.50	88.9
(10)	0.03	0.8	0.03	0.8	0.03	0.8	0.03	0.8	0.03	0.8
(11)	Ø1.25	Ø31.8	Ø2.00	Ø50.8	Ø3.00	Ø76.2	Ø3.00	Ø76.2	Ø4.50	Ø114.0
(12)	⅝-18 UNF-3B ↧0.87	M16 x 2-4H ↧22.1	½-20 UNF-3B ↧0.88	M16 x 2-6H ↧22.4	1 ¾-12 UNF-3B ↧1.75	M27 x 2-6H ↧44.5	¾-16 UNF-3B ↧1.50	M27 x 2-6H ↧38.1	1 ½-12 UNF-2B ↧2.00	M42 x 2-6H ↧50.8
(13)	2.52	64	3.00	76.2	4.34	110.2	4.71	119.6	6.44	163.6

interface
FORCE MEASUREMENT SOLUTIONS.

1201 STANDARD LOAD CELL COMPRESSION-ONLY (U.S. & METRIC)

Specifications

PARAMETERS			MODEL					
			1211	1211	1221	1231	1241	1243
			CAPACITY					
Measuring Range	U.S. (lbf)		1K, 2K	5K, 10K	25K, 50K	100K	200K	300K, 400K
	Metric (kN)		5, 10	25, 50	125, 250	450	900	1350, 1800
ACCURACY – (MAX ERROR)								
Static Error Band – %FS			±0.03	±0.04	±0.04	±0.04	±0.05	±0.05
Nonlinearity – %FS			±0.03	±0.04	±0.05	±0.05	±0.05	±0.05
Hysteresis – %FS			±0.03	±0.04	±0.05	±0.05	±0.05	±0.05
Non-repeatability – %RO			±0.01	±0.01	±0.01	±0.01	±0.01	±0.01
Creep, in 20 min – %			±0.025	±0.025	±0.025	±0.025	±0.025	±0.025
Side Load Sensitivity – %			±0.25	±0.25	±0.25	±0.25	±0.25	±0.25
Eccentric Load Sensitivity – % / in			±0.25	±0.25	±0.25	±0.25	±0.25	±0.25
TEMPERATURE								
Compensated Range		°F	+15 to +115	+15 to +115	+15 to +115	+15 to +115	+15 to +115	+15 to +115
		°C	-10 to +45	-10 to +45	-10 to +45	-10 to +45	-10 to +45	-10 to +45
Operating Range		°F	-65 to +200	-65 to +200	-65 to +200	-65 to +200	-65 to +200	-65 to +200
		°C	-55 to +90	-55 to +90	-55 to +90	-55 to +90	-55 to +90	-55 to +90
Effect on Zero – %RO MAX		°F	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008
		°C	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015
Effect on Output – %RO MAX		°F	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008
		°C	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015
ELECTRICAL								
Rated Output – mV/V (Nominal)			2.0	4.0	4.0	4.0	4.0	3.0, 4.0
Excitation Voltage – VDC MAX			20	20	20	20	20	20
Bridge Resistance – Ohm (Nominal)			350	350	350	350	350	350
Zero Balance – %RO			±1.0	±1.0	±1.0	±1.0	±1.0	±1.0
Insulation Resistance – Megohm			5000	5000	5000	5000	5000	5000
MECHANICAL								
Safe Overload – %CAP			±150	±150	±150	±150	±150	±150
Deflection @ RO		in	0.001	0.002	0.002	0.003	0.004	0.005
		mm	0.03	0.05	0.05	0.08	0.10	0.13
Optional Base – P/N (Metric)			B101	B102	B106	B104	B108	B124
Natural Frequency – kHz			6.4, 9.0	6.1, 8.6	8.2, 11.7	7.6	6.7	5.0
Weight		lbs	1.5	3.3	6.8	13.5	40	74
		kg	0.7	1.5	3.1	6	18	34
Calibration			Compression					
Material			Aluminum	Alloy Steel				

OPTIONS

- Base (recommended)
- Connector protection
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- CU.S.tom calibration
- Multiple bridge
- Special threads
- Dual diaphragm
- Special Temperature range
- Cable length
- Add connector to cable

CONNECTOR OPTIONS

- Integral cable – 10 ft (3 m)
- PT02E-10-6P bayonet connector
- PC04E-10-6P screw-type connector

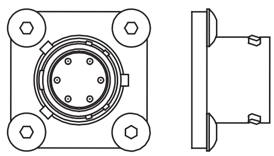
ACCESSORIES

- Mating connector
- Mating cable
- Instrumentation
- Loading hardware

1201 STANDARD LOAD CELL COMPRESSION-ONLY (U.S. &

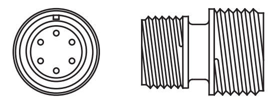
BAYONET CONNECTOR

Model 1221BAY-50K (shown)



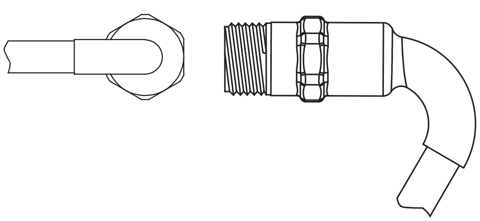
SCREW TYPE CONNECTOR

Model 1221HL-50K (shown)

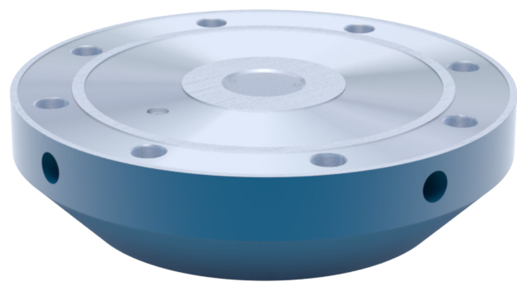


INTEGRAL 10 FT. CABLE CONNECTOR

Model 1221EX-50K (shown)



BASE



Model B1XX-1

FORCE MEASUREMENT SOLUTIONS

12x8 FLANGE LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Standard flange design mounts directly to cylinders
- Tension and compression
- Fatigue rated
- Proprietary Interface Temperature compensated strain gages
- Performance to 0.05%
- Eccentric load compensated
- Low deflection
- Alignment hole
- 0.0008%/°F (0.0015%/°C) temp. effect on output
- BaroMetric compensation
- Ease of installation
- Increased accuracy
- Ability to measure torsion with optional bridges
- Fatigue rated – Can survive 100 million fully reversed load cycles. Ideal for long term cycle testing when failure is unfordable

CONNECTOR OPTIONS

- Integral cable
- PC04E-10-6P screw connector
- PT02E-10-6P bayonet connector

STANDARD CONFIGURATION

Model 1228ACK-50K (Shown)

OPTIONS

- Connector protection
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- Add connector to cable
- Multiple bridge
- Special threads
- Dual diaphragm
- Special Temperature range
- Cable length

ACCESSORIES

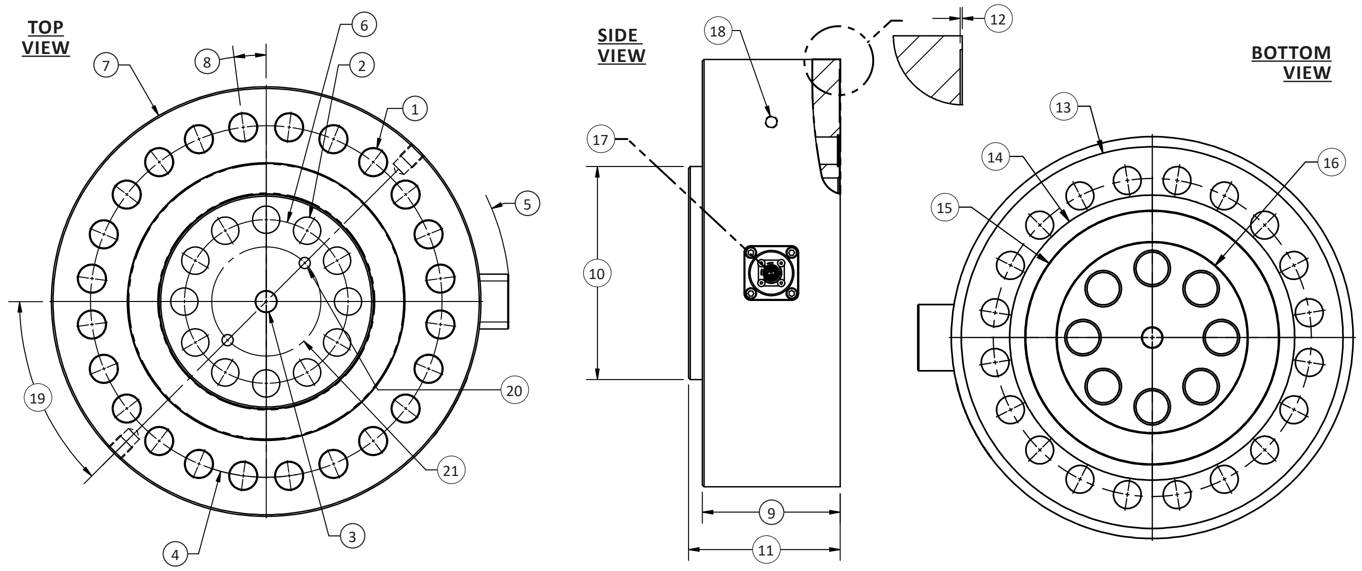
- Mating connector
- Instrumentation

Note:

- **Dimensions are approximate**
- **Contact factory for current drawings**
- ***2.41 (61.2) for 50 kN**
- **For lower capacities; refer to the 1700 model**

interface
FORCE MEASUREMENT SOLUTIONS.

12x8 FLANGE LOAD CELL (U.S. & METRIC)



Dimensions (CONTINUED)

See Drawing	MODEL							
	1228		1238		1248		1258	
	CAPACITY							
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	30K	50, 100, 140	55K	250	110K	500	220K	1000
	in	mm	in	mm	in	mm	in	mm
(1)	12 x Ø0.406 THRU ⌵ 0.44 x (90°/60°)	12 x Ø10.3 THRU ⌵ Ø11.2 (90°/60°)	16 x Ø0.50 THRU	16 x Ø12.7 THRU	16 x Ø0.66 THRU ⌵ 0.69 x 90°	16 x Ø16.7 THRU ⌵ 17.5 x 90°	20 x Ø0.83 THRU ⌵ 0.89 x 90°	20 x Ø21 THRU ⌵ 22 x 90°
(2)	8 x Ø0.41 THRU ⌵ 0.46 x 90°	8 x Ø10.5 THRU ⌵ 11.7 x 90°	8 x Ø0.65 THRU ⌵ Ø0.73 x 90°	8 x Ø16.5 THRU ⌵ Ø18.5 x 90°	8 x Ø0.65 THRU	8 x Ø16.51 THRU	8 x Ø0.969 THRU	8 x Ø24.61 THRU
(3)	Ø0.31 THRU ⌴Ø(0.3166/0.3155) ↧0.39 BOTH ENDS	Ø7.9 THRU ⌴Ø(0.8.042/8.014) ↧10.0 BOTH ENDS	Ø(0.6306/0.6299) THRU	Ø(16.017/15.999) THRU	Ø(0.6306/0.6299) THRU	Ø(16.017/15.999) THRU	Ø0.59 THRU ⌴Ø(0.6299/0.6306) ↧0.79 BOTH ENDS	Ø15.0 THRU ⌴Ø(15.999/16.017) ↧20.0 BOTH ENDS
(4)	Ø5.125	Ø130.2	Ø6.500	Ø165.1	Ø9.000	Ø228.60	Ø9.500	Ø241.30
(5)	R3.66 MIN	93.0 MIN	R4.46 MIN	113.3	R6.57	166.9	R7.07	179.5
(6)	Ø1.772	Ø45.0	Ø2.795	Ø71.0	Ø2.798	Ø70.99	Ø4.134	Ø105.00
(7)	Ø6.06	Ø153.9	Ø8.00	Ø203.1	Ø11.00	Ø279.3	Ø12.00	Ø304.8
(8)	15°		11.25°		11.25°		9°	
(9)	1.63	41.3	2.25	57.2	3.00	76.2	4.25	108.0
(10)	Ø2.41	Ø61.2	Ø3.76	Ø95.4	Ø4.81	Ø122.2	Ø5.68	Ø144.3
(11)	1.75	44.5	2.50	63.5	3.50	88.9	4.50	114.3
(12)	0.02	0.4	0.02	0.5	0.3	0.8	0.03	0.8
(13)	Ø5.86	Ø148.8	Ø7.80	Ø198.1	Ø10.60	Ø269.2	Ø11.40	Ø289.6
(14)	Ø4.3	Ø109.2	Ø5.75	Ø146.1	Ø7.40	Ø188.0	Ø8.51	Ø216.2
(15)	Ø4.01	Ø101.9	Ø5.47	Ø139.0	Ø6.78	Ø172.1	Ø7.60	Ø193.0
(16)	Ø2.41	Ø61.2	Ø3.76	Ø95.4	Ø4.81	Ø122.2	Ø5.68	Ø144.3
(17)	PC04E-10-6P		PT02E-10-6P		PT02E-10-6P		PT02E-10-6P	
(18)	–		–		–		2 x M16x2-6H ↧0.60	2 x M16x2-6H ↧15.2
(19)	–		–		33.75°		45°	
(20)	–		–		–		–	
(21)	–		–		–		–	

12x8 FLANGE LOAD CELL (U.S. & METRIC)

Dimensions (CONTINUED)

See Drawing	MODEL					
	1268		1288		1298	
	CAPACITY					
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	330K	1500	540K	2400	742K	3300
	in	mm	in	mm	in	mm
(1)	0.98	25.0	28 x Ø1.06 THRU	28 x Ø26.9 THRU	32 x Ø1.32 THRU	32 x Ø33.53 THRU
(2)	12 x Ø0.984 THRU	12 x Ø24.99 THRU	18 x Ø1.37 THRU ⌵ $1.46^{\pm0.02}$ x 90° FAR SIDE	18 x Ø34.8 THRU ⌵ $37.1^{\pm0.4}$ x 90° FAR SIDE	12 X 1.72 THRU ⌵ Ø$1.84^{\pm0.02}$ X 90° NEAR SIDE	12 X 43.69 THRU ⌵ Ø$46.74^{\pm0.51}$ X 90° NEAR SIDE
(3)	Ø0.75 THRU ⌴ Ø(0.7882/0.7874) ↧ 0.79 BOTH ENDS	Ø19.05 THRU ⌴ Ø(20.02/20.00) ↧ 20.1 BOTH ENDS	Ø1.00 THRU ⌴ Ø(1.0236/1.0244) ↧ 1.05 BOTH ENDS	Ø31.8 THRU ⌴ Ø(26.000/26.020) ↧ 26.7 BOTH ENDS	Ø1.25 THRU ⌴ Ø$1.3391^{\pm0.0005}$ ↧ 1.33 BOTH ENDS	Ø31.8 THRU ⌴ Ø$34.013^{\pm0.013}$ ↧ 33.8 BOTH ENDS
(4)	Ø12.684	Ø322.17	Ø16.500	Ø419.10	Ø20.500	Ø520.70
(5)	R8.80 MIN	223.6 MIN	R11.29 MIN	286.8 MIN	Ø20.500	Ø520.70
(6)	Ø5.906	Ø150.01	Ø8.465	Ø215.00	10.63	270.0
(7)	Ø15.50	Ø393.7	Ø20.50	Ø520.7	–	
(8)	7.5°		6.43°		5.63°	
(9)	5.00	127.0	6.00	152.4	7.50	190.5
(10)	Ø7.73	Ø196.3	Ø10.55	Ø267.9	13.79	350.27
(11)	5.50	139.7	6.25	158.8	7.75	196.85
(12)	0.03	0.8	0.03	0.8	0.03	0.76
(13)	–		Ø19.63	Ø498.6	24.70	627.38
(14)	–		Ø14.46	Ø367.3	18.10	459.74
(15)	–		Ø13.20	Ø335.2	16.21	411.73
(16)	–		–	–	–	–
(17)	PT02E-10-6P(023)		PT02E-10-6P		2 x LEMO FWG.2B.306.CLA	
(18)	2 x M16x2-6H ↧ 0.60 Lifting Threads	2 x M16x2-6H ↧ 15.2 Lifting Threads	4 x M20x2.5-6G ↧ 1.00	4 x M20x2.5-6G ↧ 25.4	4 x M24x3 ↧ 1.40	4 x M24x3 ↧ 35.6
(19)	45°		–		30°	
(20)	2 x M12x1.75-6H ↧ 0.70	2 x M12x1.75-6H ↧ 17.8	–		–	
(21)	Ø3.937	Ø100.00	–		–	

FORCE MEASUREMENT SOLUTIONS.

12x8 FLANGE LOAD CELL (U.S. & METRIC)

Specifications

PARAMETERS			MODEL						
			1228	1238	1248	1258	1268	1288	1298
			CAPACITY						
Measuring Range	U.S. (lbf)		30K	55K	110K	220K	330K	540K	742K
	Metric (kN)		50, 100, 140	250	500	1000	1500	2400	3300
ACCURACY – (MAX ERROR)									
Static Error Band– %FS			±0.05	±0.05	±0.06	±0.10	±0.12	±0.15	±0.20
Nonlinearity – %FS			±0.05	±0.05	±0.06	±0.10	±0.12	±0.15	±0.20
Hysteresis – %FS			±0.05	±0.05	±0.07	±0.10	±0.12	±0.15	±0.20
Nonrepeatability – %RO			±0.01	±0.01	±0.01	±0.01	±0.01	±0.01	±0.01
Creep, in 20 min – %			±0.025	±0.025	±0.025	±0.025	±0.025	±0.025	±0.025
Side Load Sensitivity – %			±0.25	±0.25	±0.25	±0.25	±0.25	±0.25	±0.25
Eccentric Load Sensitivity – %		in	±0.25	±0.25	±0.25	±0.25	±0.25	±0.25	±0.50
		mm	±0.01	±0.01	±0.01	±0.01	±0.01	±0.01	±0.02
TEMPERATURE									
Compensated Range		°F	+15 to +115	+15 to +115	+15 to +115	+15 to +115	+15 to +115	+15 to +115	+15 to +115
		°C	-10 to +45	-10 to +45	-10 to +45	-10 to +45	-10 to +45	-10 to +45	-10 to +45
Operating Range		°F	-65 to +200	-65 to +200	-65 to +200	-65 to +200	-65 to +200	-65 to +200	-65 to +200
		°C	-55 to +90	-55 to +90	-55 to +90	-55 to +90	-55 to +90	-55 to +90	-55 to +90
Effect on Zero – %RO MAX		°F	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008
		°C	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015
Effect on Output – %RO / °F MAX		°F	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008
		°C	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015
ELECTRICAL									
Rated Output – mV/V (Nominal)			2.2	2.2	2.2	2.2	2.2	2.2	2.2
Excitation Voltage – VDC MAX			20	20	20	20	20	20	20
Bridge Resistance – Ohm (Nominal)			350 ±3.5	350 ±3.5	350 ±3.5	350 ±3.5	350 ±3.5	350 ±3.5	350 ±3.5
Zero Balance – %RO MAX			±1.0	±1.0	±1.0	±1.0	±1.0	±1.0	±1.0
Insulation Resistance – Megohm – MIN			5000	5000	5000	5000	5000	5000	5000
MECHANICAL									
Safe Overload – %CAP			±275	±275	±275	±275	±275	±275	±275
Deflection @ RO		in	0.001	0.002	0.004	0.005	0.006	Consult factory	
		mm	0.03	0.05	0.10	0.13	0.15	Consult factory	
Natural Frequency – kHz			7	5.9	4.4	5	5.1	5.5	5.5
Weight		lbs	9.5	26	71	103	204	450	860
		kg	4.3	11.8	32.2	46.7	92.5	204	390
Connector			PT02E-10-6P						
Calibration			Tension & Compression						
Material			Alloy steel						

Catalog 2019 06-15-2020

FORCE MEASUREMENT SOLUTIONS.

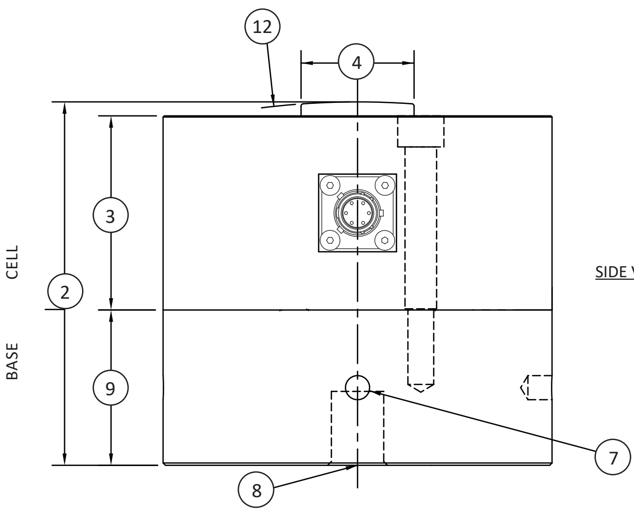
1331 COMPRESSION-ONLY LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

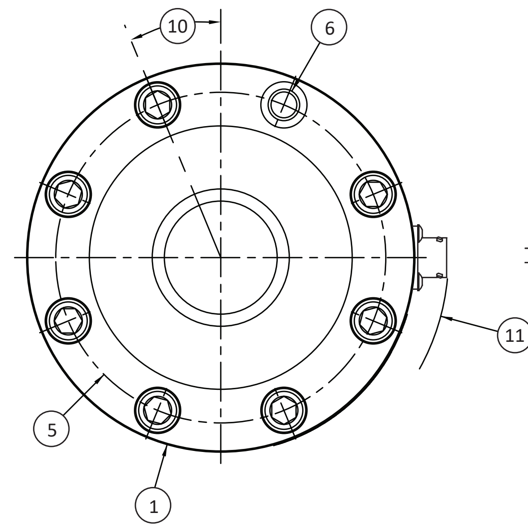
- High output – 4 mV/V
- Proprietary Interface Temperature compensated strain gages
- Small footprint
- Integral load button
- Eccentric load compensated
- 0.0008%/°F (0.0015%/°C) temp effect on output
- BaroMetric compensation

STANDARD CONFIGURATION

Model 1331FGT-100K-B (Shown)



SIDE VIEW



TOP VIEW

Dimensions

See Drawings	MODEL	
	1331	
	CAPACITY	
	U.S. (lbf)	Metric (kN)
	100K	450
	in	mm
(1)	Ø5.00	Ø127.0
(2)	4.68	118.9
(3)	2.50	63.5
(4)	Ø1.45	Ø36.9
(5)	Ø4.25	Ø108
(6)	Ø0.41 ↧ 2.1 ⌴ Ø 0.59 ↧ 0.40	Ø10.3 ↧ 53.3 ⌴ Ø15.0 ↧ 10.2
(7)	4x spaced 90 0.31 ↧ 0.31	4x spaced 90 7.9 ↧ 7.8
(8)	3/4-16 UNF-3B ↧ 1.00	
(9)	2.00	50.8
(10)	22.5°	
(11)	R 2.93	R 74.5
(12)	SR 10.0	SR 254

interface
FORCE MEASUREMENT SOLUTIONS.

1331 COMPRESSION-ONLY LOAD CELL (U.S. & METRIC)

Specifications

ACCURACY – (MAX ERROR)		
Static Error Band – %FS		±0.07
Nonlinearity – %FS		±0.05
Hysteresis – %FS		±0.08
Non-repeatability – %RO		±0.01
Creep, in 20 min – %		±0.025
TEMPERATURE		
Compensated Range	°F	+15 to +115
	°C	-10 to +45
Operating Range	°F	-65 to +200
	°C	-55 to +90
Effect on Zero – % RO MAX	°F	±0.0008
	°C	±0.0015
Effect on Output – % MAX	°F	±0.0008
	°C	±0.0015
ELECTRICAL		
Rated Output – mV/V (Nominal)		4.0
Excitation Voltage – VDC MAX		20
Bridge Resistance – Ohm (Nominal)		350
Zero Balance – %RO		±1.0
Insulation Resistance – Megaohm		5000 @ 50 VDC
MECHANICAL		
Safe Overload – %CAP		+150
Deflection @ RO	in	0.003
	mm	0.0762
Weight	lbs	21.971
	kg	9.965
Material		Alloy steel
Seal		Environmental

OPTIONS

- Base (recommended)
- Connector protection
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- CU.S.tom calibration
- Multiple bridge
- Special threads
- Dual diaphragm
- Special Temperature range

CONNECTOR OPTIONS

- PT02E-10-6P bayonet connector
- PC04E-10-6P screw-type connector

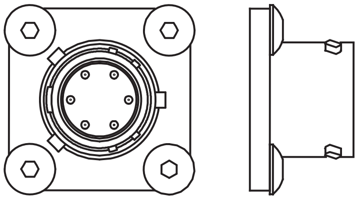
ACCESSORIES

- Mating connector
- Mating cable
- Instrumentation
- Loading hardware

1331 COMPRESSION-ONLY LOAD CELL (U.S. & METRIC)

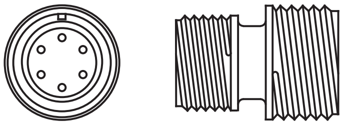
BAYONET CONNECTOR

Model 1331FGT-100K-B (Shown)

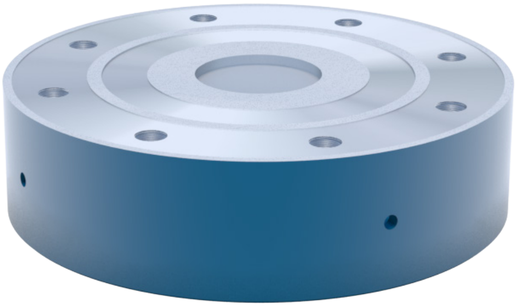


SCREW TYPE CONNECTOR

Model 1331EGJ-100K-B (Shown)



BASE



Model 19354 (Shown)

FORCE MEASUREMENT SOLUTIONS.

1500 STANDARD LOW CAPACITY LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 25 to 300 lbf (125 to 1500 kN)
- Proprietary Interface Temperature compensated strain gages
- Performance to 0.05%
- Compact 2 ¾ in (70 mm) diameter
- Eccentric load compensated
- 0.0008%/°F (0.0015%/°C) temp. effect on output
- Shunt calibration
- Low deflection

OPTIONS

- Connector protection
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- CU.S.tom calibration
- Multiple bridge
- Special threads
- Dual diaphragm
- Special Temperature range
- Special connector

CONNECTOR OPTIONS

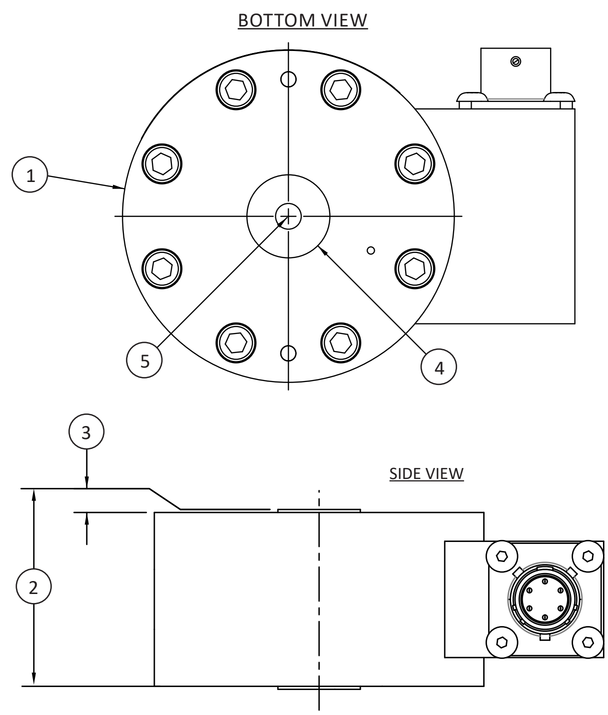
- PT02E-10-6P bayonet connector
- PC04E-10-6P screw-type connector

ACCESSORIES

- Mating connector
- Mating cable
- Instrumentation
- Loading hardware

STANDARD CONFIGURATION

Model 1500ASK-300 (Shown)



Dimensions

See Drawing	CAPACITY	
	U.S. (lbf)	Metric (N)
	25, 50, 100, 200, 300	125, 250, 500, 1000, 1500
	in	mm
(1)	2.75	69.8
(2)	1.50	38.1
(3)	0.03 - 2X	0.6 - 2X
(4)	0.69	17.5
(5)	¼-28 UNF ↧ 0.25	M6 X 1-6H ↧ 6.4

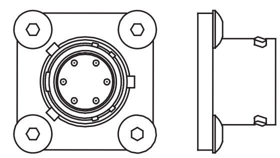
1500 STANDARD LOW CAPACITY LOAD CELL (U.S. & METRIC)

Specifications

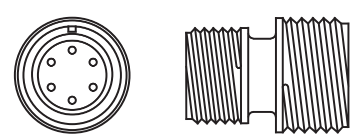
ACCURACY – (MAX ERROR)		
Static Error Band – %FS		±0.05
Nonlinearity – %FS		±0.05
Hysteresis – %FS		±0.05
Nonrepeatability – %RO		±0.02
Creep, in 20 min – %		±0.03
Eccentric Load Sensitivity – % / in		±0.25
TEMPERATURE		
Compensated Range	°F	+15 to +115
	°C	-10 to +45
Operating Range	°F	-65 to +200
	°C	-55 to +90
Effect on Output – % MAX	°F	±0.0008
	°C	±0.0015
Effect on Zero – %RO MAX	°F	±0.0015
	°C	±0.0027
ELECTRICAL		
Rated Output – mV/V (Nominal)		2.0
Zero Balance – %RO		±1.0
Bridge Resistance – Ohm (Nominal)		700
Excitation Voltage – VDC MAX		20
Insulation Resistance – Megohm		5000
MECHANICAL		
Calibration		Tension & Compression
Safe Overload – %CAP		±150
Deflection @ RO	in	0.003
	mm	0.08
Natural Frequency	(lbf)	25, 50, 100, 200, 300
	(N)	125, 250, 500, 1000, 1500
	(Hz)	2000, 2500, 4000, 6000, 7500
Weight	lbs	1
	kg	0.45
Material		Aluminum

BAYONET CONNECTOR

Model 1500ASK-300 (Shown)



Model 1500AF-300 (Shown)



FORCE MEASUREMENT SOLUTIONS.

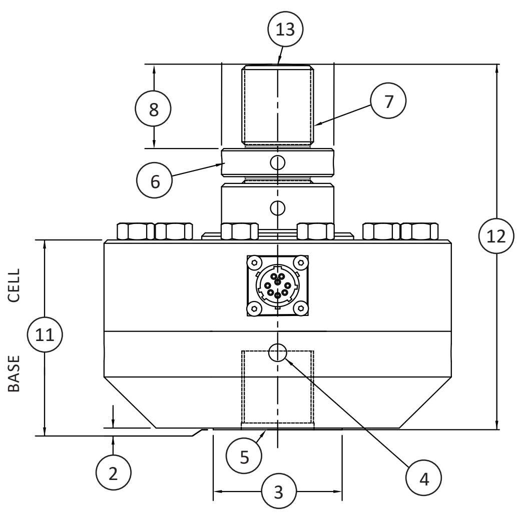
1600 GOLD STANDARD™ CALIBRATION LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

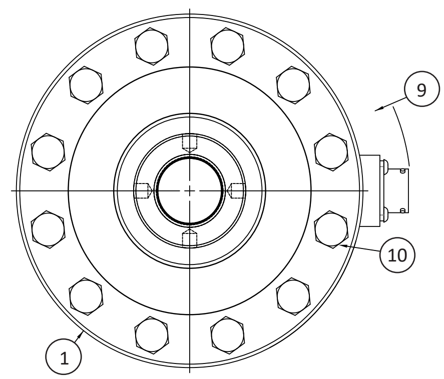
- Capacities from 500 to 200K lbf (2.2 to 900 kN)
- Tension and compression in one unit
- 0.01% creep
- 0.0008%/°F temp. effect on output
- High output – to 4 mV/V
- Eccentric load compensated
- High precision base installed
- Factory installed calibration adapter
- 3 run NIST traceable ASTM E74 calibration
- 4% lower load limit per ASTM E74

STANDARD CONFIGURATION

Model 1620AJH-50K (Shown)



SIDE VIEW



TOP VIEW

Dimensions

See Drawing	MODEL							
	1610		1620		1632		1640	
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	500, 1K, 2K, 5K, 10K	2.2, 4.5, 9, 22, 45	25K, 50K	110, 225	100K	450	200K	900
	in	mm	in	mm	in	mm	in	mm
(1)	4.13	104.7	6.06	153.9	8.00	203.1	11.00	279.3
(2)	0.03	0.80	0.03	0.80	0.03	0.80	0.03	0.80
(3)	1.25	31.8	2.25	57.2	3.00	76.2	4.50	114.3
(4)	Ø 0.25 ↧ 0.29	Ø 6.4 ↧ 7.4	Ø 0.31 ↧ 0.31	Ø 7.9 ↧ 7.9	Ø 0.31 ↧ 0.31	Ø 7.9 ↧ 7.9	Ø 0.31 ↧ 0.31	Ø 7.9 ↧ 7.9
(5)	⅝-18 UNF-3B ↧ 0.87	M16x2-4H ↧ 22.1	1 ¼-12 UNF-3B ↧ 1.40	M33x2-4H ↧ 35.6	1 ¾-12 UN-3B ↧ 1.75	M42x2-4H ↧ 44.4	2 ¾-8 UN-3B ↧ 2.75	M72x2-4H ↧ 69.8
(6)	CA-101	CA-201	CA-102	CA-202	CA-103	CA-203	Integral	
(7)	⅝-18 UNF-3A	M16x2-4G	1 ¼-12 UNF-3A	M33x2-4G	1 ¾-12 UN-3A	M42x2-4G	2 ¾-8 UN-3A	M72x2-4H
(8)	0.75	19.0	1.50	38.1	2.00	50.8	2.75	69.8
(9)	2.81	71.4	3.52	89.4	4.50	114.3	6.00	152.4
(10)	8 Places		12 Places		16 Places		16 Places	
(11)	2.50	63.5	3.50	88.9	4.50	114.3	6.50	165.1
(12)	4.38 ±0.12	111.3 ±3.1	6.50 ±0.12	165.1 ±3.1	8.75 ±0.12	222.2 ±3.1	10.5 ±0.12	266.7 ±3.1
(13)	6.00	152.4	6.00	152.4	12.00	304.8	18.00	457.2

interface
FORCE MEASUREMENT SOLUTIONS.

1600 GOLD STANDARD™ CALIBRATION LOAD CELL (U.S. & METRIC)

Specifications

PARAMETERS		MODEL					
		1610	1610	1610	1620	1632	1640
		CAPACITY					
U.S. (lbf)		500	1K, 2K	5K, 10K	25K, 50K	100K	200K
Metric (kN)		2.2	4.5, 9	22, 45	110, 225	450	900
ACCURACY – (MAX ERROR)							
Static Error Band – %FS		±0.02	±0.02	±0.025	±0.025	±0.05	±0.05
Nonlinearity – %FS		±0.03	±0.03	±0.035	±0.035	±0.05	±0.05
Hysteresis – %FS		±0.02	±0.02	±0.035	±0.045	±0.05	±0.05
Nonrepeatability – %RO		±0.005	±0.005	±0.005	±0.005	±0.005	±0.005
Creep, in 20 min – %		±0.01	±0.01	±0.01	±0.01	±0.01	±0.01
Side Load Sensitivity – %		±0.1	±0.1	±0.1	±0.1	±0.1	±0.1
Eccentric Load Sensitivity – % / in		±0.1	±0.1	±0.1	±0.1	±0.1	±0.1
Lower Load Limit – % Cap. (ASTM E74 Class A)		4.0	4.0	4.0	4.0	4.0	4.0
TEMPERATURE							
Compensated Range	°F	+15 to +115	+15 to +115	+15 to +115	+15 to +115	+15 to +115	+15 to +115
	°C	-10 to +45	-10 to +45	-10 to +45	-10 to +45	-10 to +45	-10 to +45
Operating Range	°F	-65 to +200	-65 to +200	-65 to +200	-65 to +200	-65 to +200	-65 to +200
	°C	-55 to +90	-55 to +90	-55 to +90	-55 to +90	-55 to +90	-55 to +90
Effect on Zero – %RO / °F MAX		±0.0004	±0.0004	±0.0004	±0.0004	±0.0004	±0.0004
Effect on Output – %RO / °F MAX		±0.0008	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008
ELECTRICAL							
Rated Output – mV/V (Nominal)		2.0	2.0	4.0	4.0	4.0	4.0
Excitation Voltage – VDC MAX		20	20	20	20	20	20
Bridge Resistance – Ohm (Nominal)		350	350	350	350	350	350
Zero Balance – %RO		±1.0	±1.0	±1.0	±1.0	±1.0	±1.0
Insulation Resistance – Megohm		5000	5000	5000	5000	5000	5000
MECHANICAL							
Safe Overload – %CAP		±150	±150	±150	±150	±150	±150
Deflection @ RO	in	0.002	0.002	0.004	0.004	0.006	0.010
	mm	0.05	0.05	0.10	0.10	0.15	0.25
Weight	lbs	3.8	3.8	8.0	23.5	058	171
	kg	1.724	1.724	3.629	10.659	26.308	77.564
Calibration		Tension & Compression					
Material		Alloy steel					

OPTIONS

- Connector protection
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- CU.S.tom calibration
- Multiple bridge
- Special threads
- Dual diaphragm
- Special Temperature range

CONNECTOR OPTIONS

- PT02E-12-8P bayonet connector

ACCESSORIES

- Mating connector
- Mating cable
- Instrumentation

FORCE MEASUREMENT SOLUTIONS.

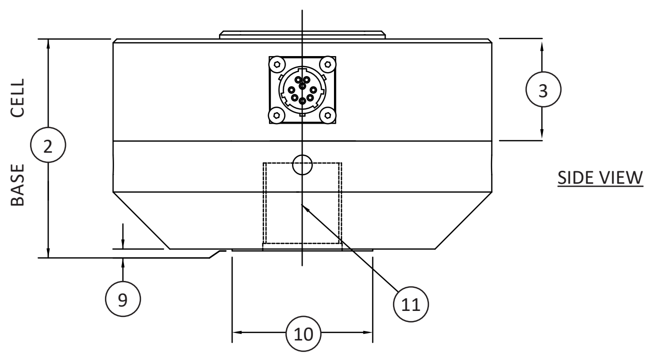
1601 GOLD STANDARD™ CALIBRATION COMPRESSION-ONLY LOAD CELL (U.S. & METRIC)

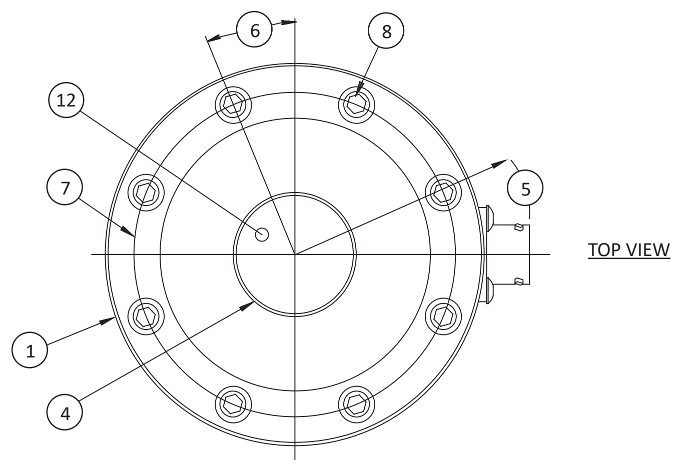
FEATURES & BENEFITS

- Capacities from 1K to 100K lbf (4.5 to 450 kN)
- 0.01% creep
- High output – to 4mV/V
- High precision base installed
- 3 run NIST traceable ASTM E74 calibration
- Eccentric load compensated
- 0.0008%/°F Temperature effect on output
- 4% lower load limit

STANDARD CONFIGURATION

Model 1621BBI-50K (Shown)





Dimensions

See Drawing	MODEL					
	1611		1621		1633	
	CAPACITY					
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	1K, 2K, 5K, 10K	4.5, 9, 22, 45	25K, 50K	110, 225	100K	450
	in	mm	in	mm	in	mm
(1)	Ø4.13	Ø104.8	Ø6.06	Ø153.9	Ø8.00	Ø203.2
(2)	2.50	63.5	3.50	89.0	4.50	114.3
(3)	1.25	31.7	1.63	41.4	2.25	57.2
(4)	Ø1.34	Ø34.0	Ø2.41	Ø61.2	Ø3.76	Ø95.5
(5)	2.78	70.0	3.50	89.0	4.47	113.0
(6)	22.5°	22.5°	15.0°	15.0°	11.25°	11.25°
(7)	Ø3.50	Ø88.9	Ø5.13	Ø130.3	Ø6.50	Ø165.1
(8)	8 Places		12 Places		16 Places	
(9)	0.03	0.8	0.03	0.8	0.03	0.8
(10)	Ø1.25	Ø31.8	Ø2.25	Ø57.2	Ø3.00	Ø76.2
(11)	⅝-18 UNF-3B ↧ 0.87	M16x2-4H ↧ 22.1	1 ¼-12 UNF-3B ↧ 1.40	M33x2-4H ↧ 35.6	1 ¾-12 UNF-3B ↧ 1.75	M42x2-4H ↧ 44.5
(12)	SR 6.00	SR 152.0	SR 8.00	SR 203.0	SR 12.0	SR 305.0

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1601 GOLD STANDARD™ CALIBRATION COMPRESSION-ONLY LOAD CELL (U.S. & METRIC)

Specifications

PARAMETERS		MODEL 1611	MODEL 1611	MODEL 1611	MODEL 1621	MODEL 1633
CAPACITY		U.S. (lbf) 1K / Metric (kN) 4.5	U.S. (lbf) 2K / Metric (kN) 9	U.S. (lbf) 5K, 10K / Metric (kN) 22, 45	U.S. (lbf) 25K, 50K / Metric (kN) 110, 225	U.S. (lbf) 100K / Metric (kN) 450
ACCURACY – (MAX ERROR)						
Static Error Band – %FS		±0.02	±0.02	±0.025	±0.03	±0.04
Nonlinearity – %FS		±0.03	±0.03	±0.04	±0.04	±0.04
Hysteresis – %FS		±0.02	±0.02	±0.04	±0.04	±0.05
Nonrepeatability – %RO		±0.005	±0.005	±0.005	±0.005	±0.005
Creep, in 20 min – %		±0.01	±0.01	±0.01	±0.01	±0.01
Side Load Sensitivity – %		±0.1	±0.1	±0.1	±0.1	±0.1
Eccentric Load Sensitivity – % / in		±0.1	±0.1	±0.1	±0.1	±0.1
Lower Load Limit – % Cap. (ASTM E74 Class A)		4.0	4.0	4.0	4.0	4.0
TEMPERATURE						
Compensated Range	°F	+15 to +115	+15 to +115	+15 to +115	+15 to +115	+15 to +115
	°C	-10 to +45	-10 to +45	-10 to +45	-10 to +45	-10 to +45
Operating Range	°F	-65 to +200	-65 to +200	-65 to +200	-65 to +200	-65 to +200
	°C	-55 to +90	-55 to +90	-55 to +90	-55 to +90	-55 to +90
Effect on Zero – %RO / °F MAX		±0.0004	±0.0004	±0.0004	±0.0004	±0.0004
Effect on Output – %RO / °F MAX		±0.0008	±0.0008	±0.0008	±0.0008	±0.0008
ELECTRICAL						
Rated Output – mV/V (Nominal)		2.0	2.0	4.0	4.0	4.0
Excitation Voltage – VDC MAX		20	20	20	20	20
Bridge Resistance – Ohm (Nominal)		350	350	350	350	350
Zero Balance – %RO		±1.0	±1.0	±1.0	±1.0	±1.0
Insulation Resistance – Megohm		5000	5000	5000	5000	5000
MECHANICAL						
Safe Overload – %CAP		±150	±150	±150	±150	±150
Deflection @ RO	in	0.002	0.002	0.004	0.004	0.006
	mm	0.05	0.05	0.10	0.10	0.15
Weight	lbs	3.3	3.3	7.5	21.5	52
	kg	1.5	1.5	3.4	1.75	23.59
Calibration		Compression				
Material		Alloy steel				

OPTIONS

- Connector protection
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- CU.S.tom calibration
- Multiple bridge
- Special threads
- Dual diaphragm
- Special Temperature range

CONNECTOR

- PT02E-12-8P

ACCESSORIES

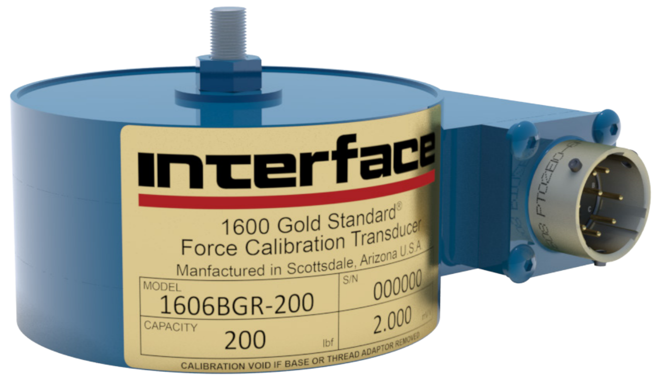
- Mating connector
- Mating cable
- Instrumentation
- Loading hardware
- Calibration software

1606 GOLD STANDARD™ LOW CAPACITY CALIBRATION LOAD CELL (U.S. & METRIC)

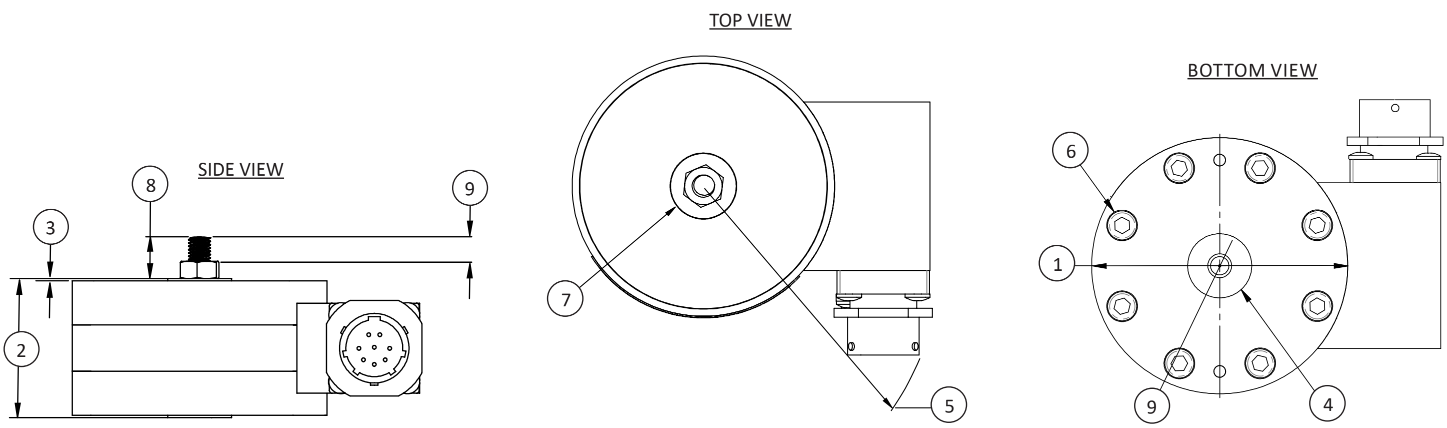
FEATURES & BENEFITS

- Capacities from 50 to 300 lbf (250 to 1,500 N)
- Tension & compression in one unit
- 0.02% creep
- 3 run NIST traceable ASTM E74 calibration
- Factory installed calibration adapter
- Eccentric load compensated
- 0.0008%/°F Temperature effect on output
- 4% lower load limit per ASTM E74
- Higher capacities available

STANDARD CONFIGURATION



Model 1606BGR-2.5K (Shown)



Dimensions

See Drawing	CAPACITY	
	U.S. (lbf)	Metric (N)
	50, 100, 200, 300	250, 500, 1000, 1500
	in	mm
(1)	2.75	69.8
(2)	1.50	38.1
(3)	0.03 2x	0.6 2x
(4)	0.69	17.5
(5)	2.85	72.3
(6)	8 Places	
(7)	0.69	17.5
(8)	0.45	11.4
(9)	¼-28 UNF ↧ 0.25	M6x1-6H ↧ 6.4

1606 GOLD STANDARD™ LOW CAPACITY CALIBRATION LOAD CELL (U.S. & METRIC)

Specifications

PARAMETERS		MODEL			
		1606		1606	
		CAPACITY			
		U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)
		50	250	100, 200, 300	500, 1000, 1500
ACCURACY – (MAX ERROR)					
Static Error Band – %FS		±0.03		±0.02	
Nonlinearity – %FS		±0.04		±0.03	
Hysteresis – %FS		±0.03		±0.02	
Nonrepeatability – %RO		±0.005		±0.005	
Creep, 20 min – %		±0.02		±0.02	
Side Load Sensitivity – %		±0.25		±0.25	
Eccentric Load Sensitivity – % / in		±0.25		±0.25	
Lower Load Limit – % Cap. (ASTM E74 CLASS A)		4.0		4.0	
TEMPERATURE					
Compensated Range	°F	+15 to +115		+15 to +115	
	°C	-10 to +45		-10 to +45	
Operating Range	°F	-65 to +200		-65 to +200	
	°C	-55 to +90		-55 to +90	
Effect on Zero – %RO / °F MAX		±0.0008		±0.0008	
Effect on Output – % / °F MAX		±0.0008		±0.0008	
ELECTRICAL					
Rated Output – mV/V (Nominal)		2.0		2.0	
Excitation Voltage – VDC MAX		20		20	
Bridge Resistance – Ohm (Nominal)		700		700	
Zero Balance – %RO		±1.0		±1.0	
Insulation Resistance – Megohm		5000		5000	
MECHANICAL					
Safe Overload – %CAP		±150		±150	
Deflection @ RO	in	0.003		0.003	
	mm	0.08		0.08	
Weight	lbs	1.0		1.0	
	kg	0.45		0.45	
Calibration		Tension & Compression			
Material		Tool steel			

OPTIONS

- Connector protection
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- CU.S.tom calibration
- Multiple bridge
- Special threads
- Dual diaphragm
- Special Temperature range

CONNECTOR

- PT02E-12-8P

ACCESSORIES

- Mating connector
- Mating cable
- Instrumentation
- Calibration software

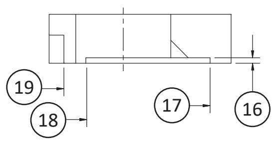
1700 FLANGE LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

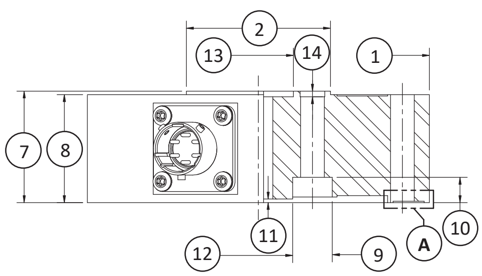
- Capacities from 220 to 14K lbf (1 to 63 kN)
- Standard flange design mounts directly to cylinders
- Tension and compression
- Proprietary Interface temp. compensated strain gages
- Performance to 0.05%
- Eccentric load compensated
- 0.0008%/°F (0.0015%/°C) temp. effect on output

STANDARD CONFIGURATION

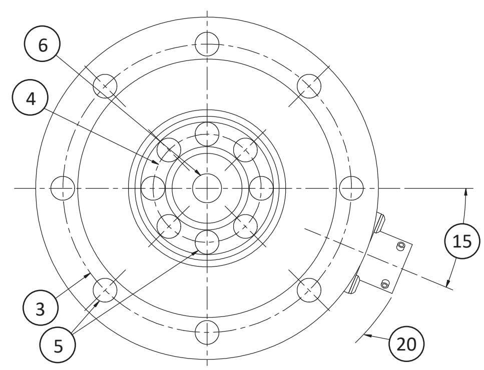
Model 1720ACK-10KN (Shown)



DETAIL A



SIDE VIEW



TOP VIEW

Dimensions

See Drawings	MODEL					
	1710		1720		1730	
	CAPACITY					
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	220, 550, 1.1K, 1.4K	1, 2.5, 5, 6.5	2.2K, 4.5K, 5.5K	10, 20, 25	11K, 14K	50, 63
	in	mm	in	mm	in	mm
(1)	Ø3.03	Ø77.0	Ø3.74	Ø95.0	Ø3.98	Ø101.0
(2)	Ø1.07	Ø27.3	Ø1.57	Ø40.0	Ø1.57	Ø40.0
(3)	Ø2.638	Ø67.0	Ø3.150	Ø80.00	Ø3.39±0.01	Ø86.0±0.01
(4)	Ø0.787	Ø20.0	Ø1.181	Ø30.00	Ø1.18±0.01	Ø30.0±0.01
(5)	Ø0.209	Ø5.30	Ø0.26 THRU	Ø6.6 THRU	Ø0.26 THRU	Ø6.6 THRU
	6 Places EQ SP		8 Places EQ SP			
(6)	M10 X 1 ↧ 0.67 2X ⌴ Ø0.500 + 0.002, -0.000 ↧ 0.08	M10 X 1 ↧ 17 2X ⌴ Ø12.70 +0.05, -0.00 ↧ 2.0	Ø0.315 H9	Ø8.0 H9	Ø0.315 H9	Ø8.0 H9
(7)	1.14	29.0	1.22	31.0	1.22	31.0
(8)	1.06	27.0	1.18	30.0	1.18	30.0
(9)	-	-	Ø1.61	Ø41.0	Ø1.61	Ø41.0
(10)	0.25	6.4	0.28	7.0	0.28	7.0
(11)	-	-	0.04	1.0	0.04	1.0
(12)	-	-	Ø0.75	Ø19.0	Ø0.75	Ø19.0
(13)	-	-	Ø0.76	Ø19.4	Ø0.76	Ø19.4
(14)	R 0.79	R 20.0	0.06 2x	1.6 2x	0.06 2x	1.6 2x
(15)	30°		22.5°		22.5°	
(16)	0.02	0.4	0.02	0.4	0.015	0.38
(17)	Ø2.94	Ø74.6	Ø3.63	Ø92.1	Ø3.91	Ø99.4
(18)	Ø2.40	Ø61	Ø2.95	Ø74.9	Ø2.89	Ø73.3
(19)	Ø2.300, +0.002, -0.000	Ø58.42 +0.5, -0.00	Ø2.83	Ø71.8	Ø2.83	Ø71.8

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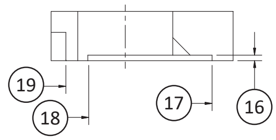
1700 FLANGE LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

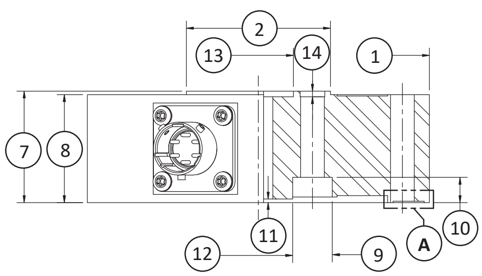
- Capacities from 220 to 14K lbf (1 to 63 kN)
- Standard flange design mounts directly to cylinders
- Tension and compression
- Proprietary Interface temp. compensated strain gages
- Performance to 0.05%
- Eccentric load compensated
- 0.0008%/°F (0.0015%/°C) temp. effect on output

STANDARD CONFIGURATION

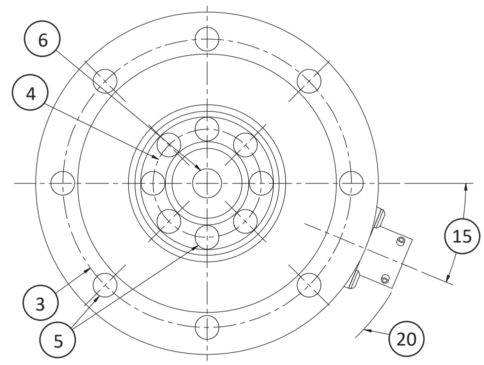
Model 1720ACK-10KN (Shown)



DETAIL A



SIDE VIEW



TOP VIEW

Dimensions

See Drawings	MODEL					
	1710		1720		1730	
	CAPACITY					
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	220, 550, 1.1K, 1.4K	1, 2.5, 5, 6.5	2.2K, 4.5K, 5.5K	10, 20, 25	11K, 14K	50, 63
	in	mm	in	mm	in	mm
(1)	Ø3.03	Ø77.0	Ø3.74	Ø95.0	Ø3.98	Ø101.0
(2)	Ø1.07	Ø27.3	Ø1.57	Ø40.0	Ø1.57	Ø40.0
(3)	Ø2.638	Ø67.0	Ø3.150	Ø80.00	Ø3.39±0.01	Ø86.0±0.01
(4)	Ø0.787	Ø20.0	Ø1.181	Ø30.00	Ø1.18±0.01	Ø30.0±0.01
(5)	Ø0.209	Ø5.30	Ø0.26 THRU	Ø6.6 THRU	Ø0.26 THRU	Ø6.6 THRU
	6 Places EQ SP		8 Places EQ SP			
(6)	M10 X 1 ↧ 0.67 2X ⌴ Ø0.500 + 0.002, -0.000 ↧ 0.08	M10 X 1 ↧ 17 2X ⌴ Ø12.70 +0.05, -0.00 ↧ 2.0	Ø0.315 H9	Ø8.0 H9	Ø0.315 H9	Ø8.0 H9
(7)	1.14	29.0	1.22	31.0	1.22	31.0
(8)	1.06	27.0	1.18	30.0	1.18	30.0
(9)	-	-	Ø1.61	Ø41.0	Ø1.61	Ø41.0
(10)	0.25	6.4	0.28	7.0	0.28	7.0
(11)	-	-	0.04	1.0	0.04	1.0
(12)	-	-	Ø0.75	Ø19.0	Ø0.75	Ø19.0
(13)	-	-	Ø0.76	Ø19.4	Ø0.76	Ø19.4
(14)	R 0.79	R 20.0	0.06 2x	1.6 2x	0.06 2x	1.6 2x
(15)	30°		22.5°		22.5°	
(16)	0.02	0.4	0.02	0.4	0.015	0.38
(17)	Ø2.94	Ø74.6	Ø3.63	Ø92.1	Ø3.91	Ø99.4
(18)	Ø2.40	Ø61	Ø2.95	Ø74.9	Ø2.89	Ø73.3
(19)	Ø2.300, +0.002, -0.000	Ø58.42 +0.5, -0.00	Ø2.83	Ø71.8	Ø2.83	Ø71.8

1700 FLANGE LOAD CELL (U.S. & METRIC)

Specifications

PARAMETERS		MODEL		
		1710	1720	1730
		CAPACITY		
Measuring Range	U.S. (lbf)	220, 550, 1.1K, 1.4K	2.2K, 4.5K, 5.5K	11K, 14K
	Metric (kN)	1, 2.5, 5	10, 20, 25	50, 63
ACCURACY – (MAX ERROR)				
Nonlinearity – %FS		±0.04	±0.04	±0.04
Hysteresis – %FS		±0.03	±0.03	±0.05
Nonrepeatability – %RO		±0.01	±0.01	±0.01
Creep, in 20 min – %		±0.025	±0.025	±0.025
TEMPERATURE				
Compensated Range	°F	+15 to +115	+15 to +115	+15 to +115
	°C	-10 to +45	-10 to +45	-10 to +45
Operating Range	°F	-65 to +200	-65 to +200	-65 to +200
	°C	-55 to +90	-55 to +90	-55 to +90
Effect on Output – % MAX	°F	±0.0008	±0.0008	±0.0008
	°C	±0.0015	±0.0015	±0.0015
Effect on Zero – %RO MAX	°F	±0.0008	±0.0008	±0.0008
	°C	±0.0015	±0.0015	±0.0015
ELECTRICAL				
Rated Output – mV/V (nominal)		2.0	2.0	2.0
Zero Balance – %RO		±1.0	±1.0	±1.0
Bridge Resistance – Ohm (nominal)		350 ± 3.5	350 ± 3.5	350 ± 3.5
Excitation Voltage – VDC MAX		20	20	20
Insulation Resistance – Megohm		5000	5000	5000
MECHANICAL				
Safe Overload – %CAP		±150	±150	±150
Weight	lbs	1.34	3.0	3.0
	kg	0.61	1.36	1.36
Calibration		Tension & Compression		
Material		Aluminum	Alloy steel	

OPTIONS

- Connector protection
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- CU.S.tom calibration
- Multiple bridge
- Dual diaphragm
- Special Temperature range
- Cable length
- Add connector to cable

CONNECTOR OPTIONS

- Integral Cable – 10 ft (3 m)
- PT02E-10-6P bayonet connector
- PC04E-10-6P screw-type connector

ACCESSORIES

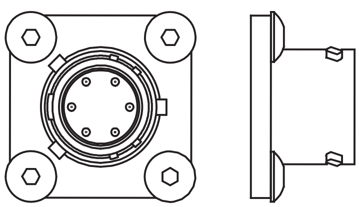
- Mating connector
- Mating cable
- Instrumentation

FORCE MEASUREMENT SOLUTIONS

1700 FLANGE LOAD CELL (U.S. & METRIC)

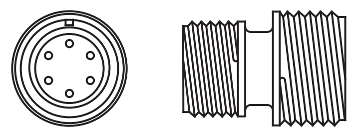
BAYONET CONNECTOR

Model 1720ACK-10KN (Shown)



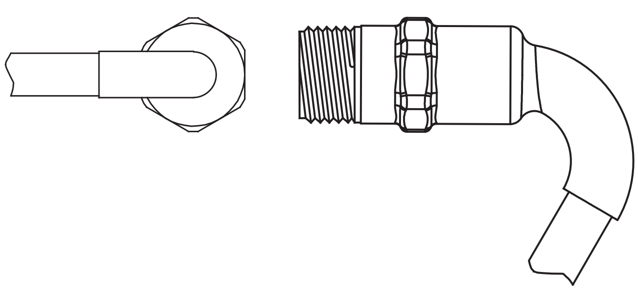
SCREW TYPE CONNECTOR

Model 1720AF-10KN (Shown)



INTEGRAL 10 FT. CABLE CONNECTOR

Model 1720AJ-10KN (Shown)



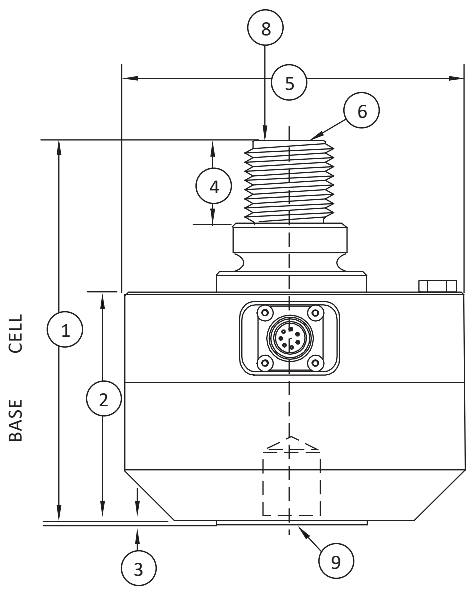
1800 PLATINUM STANDARD™ CALIBRATION LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

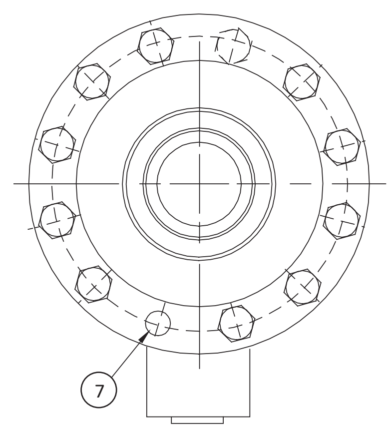
- Capacities from 1.1K to 55K lbf (5 to 250 kN)
- Handcrafted excellence for the most demanding calibration requirements
- Tension and compression in one unit
- 0.005% nonrepeatability
- Capable of 2% lower load limit per ASTM E74
- High precision base installed
- ASTM E74 calibration Standard
- Eccentric load compensated
- 0.0008%/°F temp. effect on output
- Connector protector Standard

STANDARD CONFIGURATION

Model 1820CJY-50K (Shown)



SIDE VIEW



TOP VIEW

Dimensions

See Drawing	MODEL					
	1810		1820		1830	
	CAPACITY					
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	1.1K, 2.2K, 3.3K, 5.5K	5, 10, 15, 25	11K, 22K	50, 100	55K	250
	in	mm	in	mm	in	mm
(1)	4.65	118.1	6.85	174.0	8.26	209.7
(2)	3.28	83.3	4.13	104.9	5.00	127.0
(3)	0.03	0.8	0.03	0.8	0.03	0.8
(4)	0.75	19.1	1.50	38.1	1.88	47.8
(5)	4.13	104.9	6.06	154.0	8.00	203.2
(6)	6.00	152.4	6.00	152.4	8.00	203.2
(7)	8 Places		12 Places		16 Places	
(8)	⅝-18 UNF-3A	M16x2 - 4H	1¼-12 UNF - 3A	M33x2 - 4H	1¾-12 UNF - 3A	M42x2 - 4H
(9)	⅝-18 UNF - 3B ↧0.75	M16x2 - 4H ↧19.1	1¼-12 UNF - 3B ↧1.25	M33x2 - 4H ↧31.8	1¾-12 UNF- 3B ↧2.00	M42x2 - 4H ↧50.8

1800 PLATINUM STANDARD™ CALIBRATION LOAD CELL (U.S. & METRIC)

Specifications

PARAMETERS			MODEL				
			1810	1810	1810	1820	1830
			CAPACITY				
Measuring Range	U.S. (lbf)		1.1K	2.2K, 3.3K	5.5K	11K, 22K	55K
	Metric (kN)		5	10, 15	25	50, 100	250
ACCURACY – (MAX ERROR)							
Static Error Band – %FS			±0.020	±0.020	±0.020	±0.020	±0.025
Nonlinearity – %FS			±0.020	±0.020	±0.020	±0.020	±0.020
Hysteresis – %FS			±0.020	±0.025	±0.025	±0.025	±0.030
Nonrepeatability – % RO			±0.005	±0.005	±0.005	±0.005	±0.005
Creep, in 20 min – %			±0.01	±0.01	±0.01	±0.01	±0.01
Side Load Sensitivity – %			±0.1	±0.1	±0.1	±0.1	±0.1
Eccentric Load Sensitivity – % / in			±0.05	±0.05	±0.05	±0.05	±0.05
Lower Load Limit – % Cap. (ASTM E74 Class A)			2.0	2.0	2.0	2.0	2.0
TEMPERATURE							
Compensated Range		°F	+15 to +115	+15 to +115	+15 to +115	+15 to +115	+15 to +115
		°C	-10 to +45	-10 to +45	-10 to +45	-10 to +45	-10 to +45
Operating Range		°F	-65 to +200	-65 to +200	-65 to +200	-65 to +200	-65 to +200
		°C	-55 to +90	-55 to +90	-55 to +90	-55 to +90	-55 to +90
Effect on Zero – %RO / °F MAX			±0.0004	±0.0004	±0.0004	±0.0004	±0.0004
Effect on Output – %RO / °F MAX			±0.0008	±0.0008	±0.0008	±0.0008	±0.0008
Electrical							
Rated Output – mV/V (Nominal)			2.0	2.0	2.0	2.0	2.0
Excitation Voltage – VDC MAX			20	20	20	20	20
Bridge Resistance – Ohm (Nominal)			700	700	700	700	700
Zero Balance – %RO			±1.0	±1.0	±1.0	±1.0	±1.0
Insulation Resistance – Megohm			5000	5000	5000	5000	5000
MECHANICAL							
Safe Overload – %CAP			±150	±300	±300	±300	±300
Deflection @ RO		in	0.002	0.002	0.002	0.002	0.004
		mm	0.05	0.05	0.05	0.05	0.10
Weight		lbs	3.8	9	9	25	62
		kg	1.7	4.1	4.1	11.3	28.1
Calibration			Tension & Compression				
Material			Alloy steel				

OPTIONS

- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- CU.S.tom calibration
- Multiple bridge
- Special threads
- Dual diaphragm
- Special Temperature range
- Cable length
- Add connector to cable

CONNECTOR OPTIONS

- PT02E-12-8P bayonet connector

ACCESSORIES

- Mating connector
- Mating cable
- Instrumentation

interface
FORCE MEASUREMENT SOLUTIONS

2000 HIGH PRECISION CANISTER LOAD CELL (U.S. & METRIC)

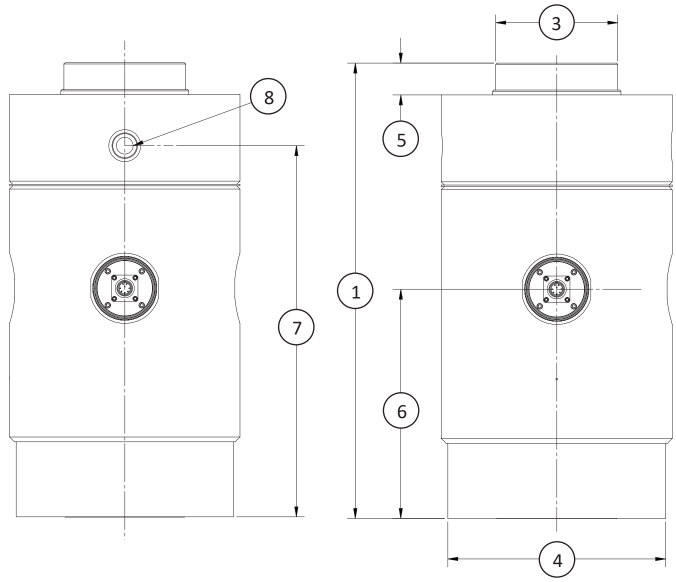
FEATURES & BENEFITS

- Capacities from 50K to 300K lbf (250 to 1350 kN)
- Higher capacities available
- High performance
- Ring-type design
- Rugged construction
- Environmentally protected

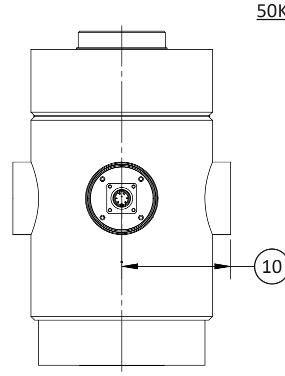
STANDARD CONFIGURATION

Model 2040EYH-100K (Shown)

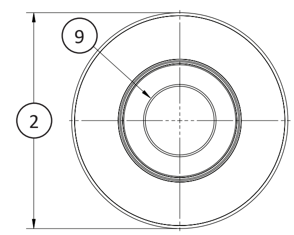
FRONT VIEW SIDE VIEW



50K ONLY



TOP VIEW



Dimensions

See Drawings	MODEL					
	2030		2040		2060	
	CAPACITIES					
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	50K	250	100K	450	200K, 300K	900, 1350
	in	mm	in	mm	in	mm
(1)	11.5	292.1	17.75	450.85	22.0	558.8
(2)	Ø6.25	Ø158.75	Ø9.0	Ø228.6	Ø10.0	Ø254
(3)	Ø3.0	Ø76.2	Ø4.75	Ø120.65	Ø5.75	Ø146.05
(4)	Ø5.73	Ø145.54	Ø8.49	Ø215.65	Ø9.49	Ø241.05
(5)	0.63	16.0	1.24	31.5	1.25	31.75
(6)	5.75	146.05	9.0	228.6	11.0	279.4
(7)	N/A	N/A	14.5	368.3	18.25	463.55
(8)	N/A	N/A	¾-10 UNC – 2B		¾-10 UNC – 2B	
			↧1	↧25.4	↧1	↧25.4
(9)	2-12 UN – 2B		3-8 UN – 2B		4-8 UN – 2B	
	↧2.5	↧127	↧4.5	↧114.3	↧4.5	↧114.3
(10)	3x 3.75	3x 95.25	N/A	N/A	N/A	N/A

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

2000 HIGH PRECISION CANISTER LOAD CELL (U.S. & METRIC)

Specifications

PARAMETERS			2030	2040	2060
			MODEL		
			CAPACITY		
Measuring Range	U.S. (lbf)		50K	100K	200K, 300K
	Metric (kN)		250	450	900, 1350
ACCURACY – (MAX ERROR)					
Nonlinearity – %FS			± 0.05	± 0.05	± 0.05
Hysteresis – %FS			± 0.03	± 0.03	± 0.03
Nonrepeatability – %RO			± 0.02	± 0.02	± 0.02
Creep in 20 min – %			± 0.025	± 0.025	± 0.025
TEMPERATURE					
Compensated Range		°F	15 to +115	15 to +115	15 to +115
		°C	-10 to 45	-10 to 45	-10 to 45
Operating Range		°F	−65 to +200	−65 to +200	−65 to +200
		°C	-55 to 90	-55 to 90	-55 to 90
Effect on Zero – %RO / °F			± 0.0008	± 0.0008	± 0.0008
Effect on Output – %RO / °F			± 0.0008	± 0.0008	± 0.0008
ELECTRICAL					
Rated Output – mV/V (Nominal)			3.0 ± 0.3	3.0 ± 0.3	3.0 ± 0.3
Excitation – VDC (Nominal)			10	10	10
Excitation – VAC/VDC (Maximum)			20	20	20
Bridge Resistance – Ohm (Nominal)			350	350	350
Zero Balance – %RO			± 1.0	± 1.0	± 1.0
Insulation Resistance – Megohm			5000	5000	5000
MECHANICAL					
Safe Overload – %CAP			150	150	150
Weight		lbs	50	150	250
		kg	22.68	68.04	113.40
Material			Alloy steel		

OPTIONS

- ASTM E74 calibration
- Standardized output
- Special thread size
- Multiple bridge
- Transducer Electronic Data Sheet (TEDS)
- CU.S.tom calibration
- Special Temperature range

CONNECTOR OPTIONS

- PC02E-12-8P connector

ACCESSORIES

- Mating connector
- Mating cable
- Instrumentation
- Loading hardware

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

2101 DUAL RANGE STANDARD LOAD CELL COMPRESSION-ONLY (U.S. & METRIC)

FEATURES & BENEFITS

- Dual range allows for accurate measurements throughout test range
- 4X to 5X overload protection on lower capacity load cell
- Proprietary Interface Temperature compensated gages
- High output for both ranges-to 4 mV/V
- Eccentric load compensated
- Shunt calibration
- Low deflection
- Lower capacity same as 1201 Compression-Only Low Profile
- Higher capacity same as 1200 Universal Low Profile

STANDARD CONFIGURATION

Model 2121-10K/50K (Shown)

OPTIONS

- Connector protection
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- CU.S.tom calibration
- Multiple bridge
- Special threads
- Dual diaphragm
- Special Temperature range
- Cable length
- Add connector to cable

CONNECTOR OPTIONS

- Integral cable (10 ft)
- PT02E-10-6P bayonet connector
- PC04E-10-6P screw-type connector

ACCESSORIES

- Mating connector
- Mating cable
- Instrumentation

Interface
FORCE MEASUREMENT SOLUTIONS.

2101 DUAL RANGE STANDARD LOAD CELL COMPRESSION-ONLY (U.S. & METRIC)

Specifications

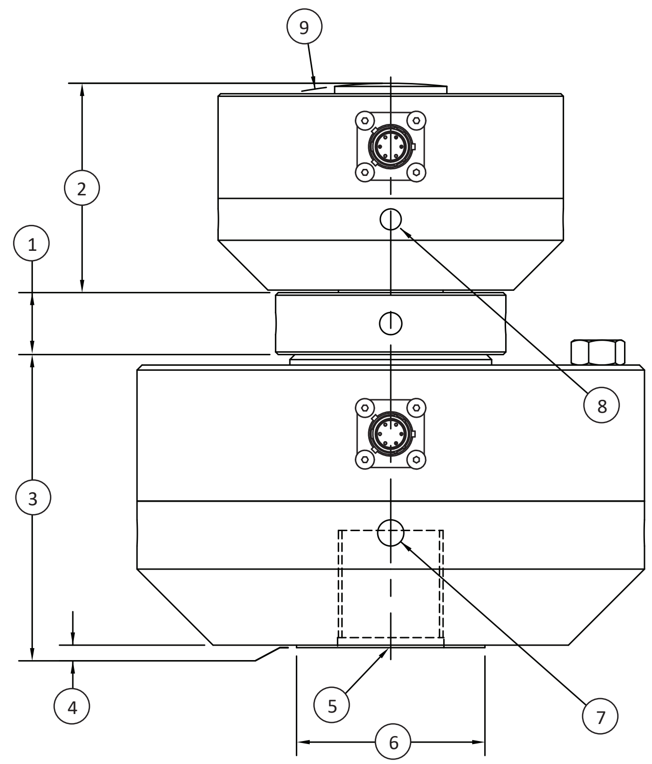
PARAMETERS			MODEL				
			2111	2121	2131	2141	
			CAPACITY				
Measuring Range	U.S. (lbf)		1K/5K, 2K/10K	5K/25K, 10K/50K	25K/100K	50K/150K	100K/270K
	Metric (kN)		5/25, 10/50	25/100, 50/250	100/450	250/675	450/1200
ACCURACY – (MAX ERROR)							
Static Error Band – %FS			±0.03/±0.04	±0.04/±0.04	±0.04/±0.06	±0.04/±0.07	±0.04/±0.07
Nonlinearity – %FS			±0.03/±0.04	±0.04/±0.04	±0.05/±0.05	±0.05/±0.07	±0.05/±0.08
Hysteresis – %FS			±0.03/±0.04	±0.04/±0.05	±0.05/±0.06	±0.05/±0.07	±0.05/±0.08
Nonrepeatability – %RO			±0.01/±0.01	±0.01/±0.01	±0.01/±0.01	±0.01/±0.01	±0.01/±0.02
Creep, in 20 min – %			±0.025/±0.025	±0.025/±0.025	±0.025/±0.025	±0.025/±0.025	±0.025/±0.025
Side Load Sensitivity – %			±0.25/±0.25	±0.25/±0.25	±0.25/±0.25	±0.25/±0.25	±0.25/±0.25
Eccentric Load Sensitivity – %/in			±0.25/±0.25	±0.25/±0.25	±0.25/±0.25	±0.25/±0.25	±0.25/±0.25
TEMPERATURE							
Compensated Range		°F	+15 to +115/+15 to +115	+15 to +115/+15 to +115	+15 to +115/+15 to +115	+15 to +115/+15 to +115	+15 to +115/+15 to +115
		°C	-10 to +45/-10 to +45	-10 to +45/-10 to +45	-10 to +45/-10 to +45	-10 to +45/-10 to +45	-10 to +45/-10 to +45
Operating Range		°F	-65 to +200/-65 to +200	-65 to +200/-65 to +200	-65 to +200/-65 to +200	-65 to +200/-65 to +200	-65 to +200/-65 to +200
		°C	-55 to +90/-55 to +90	-55 to +90/-55 to +90	-55 to +90/-55 to +90	-55 to +90/-55 to +90	-55 to +90/-55 to +90
Effect on Zero – %RO MAX		°F	±0.0008/±0.0008	±0.0008/±0.0008	±0.0008/±0.0008	±0.0008/±0.0008	±0.0008/±0.0008
		°C	±0.0015/±0.0015	±0.0015/±0.0015	±0.0015/±0.0015	±0.0015/±0.0015	±0.0015/±0.0015
Effect on Output – %RO/°F MAX		°F	±0.0008/±0.0008	±0.0008/±0.0008	±0.0008/±0.0008	±0.0008/±0.0008	±0.0008/±0.0008
		°C	±0.0015/±0.0015	±0.0015/±0.0015	±0.0015/±0.0015	±0.0015/±0.0015	±0.0015/±0.0015
ELECTRICAL							
Rated Output – mV/V (Nominal)			2.0/4.0	4.0/4.0	4.0/4.0	4.0/4.0	4.0/4.0
Excitation Voltage – VDC MAX			20/20	20/20	20/20	20/20	20/20
Bridge Resistance – Ohm (Nominal)			350/350	350/350	350/350	350/350	350/350
Zero Balance – %RO			±1.0/±1.0	±1.0/±1.0	±1.0/±1.0	±1.0/±1.0	±1.0/±1.0
Insulation Resistance – Megohm			5000/5000	5000/5000	5000/5000	5000/5000	5000/5000
MECHANICAL							
Safe Overload – %CAP			±150*	±150*	±150*	±150*	±150*
Deflection @ RO		in	0.001/0.002	0.002/0.002	0.002/0.003	0.002/0.012	0.003/0.006
		mm	0.03/0.05	0.05/0.05	0.05/0.08	0.05/0.30	0.08/0.15
Optional Base – P/N (Metric)			B101/B102 (M)	B102/B103 (M)	B106/B112 (M)	B106/B105 (M)	B104/B116 (M)
Natural Frequency – kHz			6.4, 9.0/6.6, 9.4	6.1, 8.6/ 6.5, 7.0	8.2, 11.7/5.8	8.2, 11.7/4.9	7.6/5.0
Weight		lbs	1.5/3.33	3.3/9.5	6.8/26	6.8/68	13.5/70
		kg	0.7/1.5	1.5/4.3	3.1/11.8	3.1/30.9	6/31.8
Calibration			Compression/Compression				
Material			Alloy Steel/Alloy Steel				

* Based on largest load cell capacity in stack.

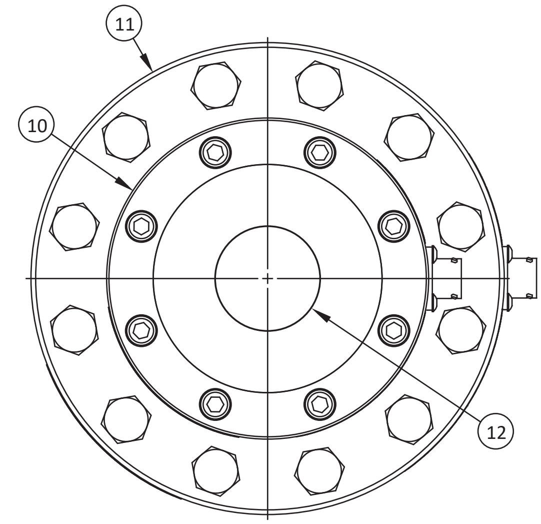
interface
FORCE MEASUREMENT SOLUTIONS.

2101 DUAL RANGE STANDARD LOAD CELL COMPRESSION-ONLY (U.S. & METRIC)

SIDE VIEW



TOP VIEW



Dimensions

See Drawing	MODEL									
	2111		2121		2131		2141			
	CAPACITY									
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	1K/5K, 2K/10K	5/25, 10/50	5K/25K, 10K/50K	25/100, 50/250	25K/100K	100/450	50K/150K	250/675	100K/270K	450/1200
	in	mm	in	mm	in	mm	in	mm	in	mm
(1)	0.25	6.35	0.25	6.35	0.25	6.35	0.3125	7.938	0.3125	7.938
(2)	2.51	63.8	2.51	63.8	3.00	76.2	3.00	76.3	4.25	108
(3)	2.51	63.8	3.50	88.9	4.50	114.3	6.50	165.1	8.00	203.2
(4)	0.03	0.8	0.03	0.8	0.03	0.8	0.03	0.8	0.03	0.8
(5)	⅝-18 UNF-3B ↧ 0.87	M16 x 2-4H ↧ 22.1	1¼-12 UNF-3B ↧ 1.40	M33 x 2-4H ↧ 35.6	1¾-12 UNF-3B ↧ 1.75	M42 x 2-4H ↧ 44.5	2¾-8 UNF-3B ↧ 2.75	M72 x 2-4H ↧ 69.8	2¾-8 UNF-3B ↧ 2.75	M72 x 2-4H ↧ 69.8
(6)	Ø1.25	Ø31.8	Ø2.25	Ø57.2	Ø3.00	Ø76.2	Ø4.50	Ø114.3	Ø4.50	Ø114.3
(7)	4 X 0.25 ↧ 0.29	4 X 6.4 ↧ 7.4	4 X 0.31 ↧ 0.31	4 X 7.9 ↧ 7.9	4 X 0.31 ↧ 0.31	4 X 7.9 ↧ 7.9	4 X 0.31 ↧ 0.31	4 X 7.9 ↧ 7.9	4 X 0.31 ↧ 0.31	4 X 7.9 ↧ 7.9
(8)	4 X 0.25 ↧ 0.29	4 X 6.4 ↧ 7.4	4 X 0.25 ↧ 0.29	4 X 6.4 ↧ 7.4	4 X 0.31 ↧ 0.31	4 X 7.9 ↧ 7.9	4 X 0.31 ↧ 0.31	4 X 7.9 ↧ 7.9	4 X 0.31 ↧ 0.31	4 X 7.9 ↧ 7.9
(9)	SR6.00	SR152.4	SR6.00	SR152.4	SR6.00	SR152.4	SR6.00	SR152.4	SR8.00	SR203.2
(10)	Ø4.13	Ø104.8	Ø4.13	Ø104.8	Ø4.75	Ø120.7	Ø4.75	Ø120.7	Ø7.50	Ø190.5
(11)	Ø4.13	Ø104.8	Ø6.06	Ø153.9	Ø8.00	Ø203.2	Ø11.0	Ø279.0	Ø11.0	Ø279.0
(12)	Ø1.34	Ø34.0	Ø1.34	Ø34.0	Ø1.57	Ø39.9	Ø1.57	Ø39.9	Ø3.13	Ø79.5

Note:
- Dimensions are approximate
- Contact factory for current drawings

FORCE MEASUREMENT SOLUTIONS.

2160 HIGH CAPACITY COLUMN LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 300K to 1000K (1335 to 4450 kN)
- Performance to ±0.15% FS
- Compact size
- Metric and English models

Specifications

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.15
Hysteresis – %FS		±0.05
Nonrepeatability – %RO		±0.03
Creep, in 20 min – %		±0.05
TEMPERATURE		
Compensated Range	°F	+32 to +132
	°C	0 to +56
Operating Range	°F	-30 to +200
	°C	-34 to +93
Effect on Zero – %RO / °F		+0.003
Effect on Output – % / °F		+0.003
ELECTRICAL		
Rated Output – mV/V NOM		2.0
Excitation – VAC / VDC – NOM		10
Excitation – VAC / VDC - MAX		15
Bridge Resistance – Ohm NOM		350
Zero Balance – %RO		±1.0
Insulation Resistance – Megohm		> 5000
MECHANICAL		
Safe Overload – %CAP		150
Connector		MS3102A-14S-5P
Material		Alloy steel

Notes:
– Compression-Only available. Ask factory for Specifications and Dimensions.
– Consult factory for more technical information.

STANDARD CONFIGURATION

Model 2160 (Shown)

OPTIONS

- Compression-only available. Ask factory for Specifications and Dimensions.
- Multiple bridge
- Standardized output
- ASTM E74 calibration
- Special thread size
- Handles

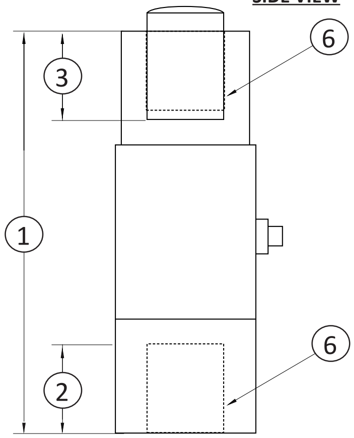
ACCESSORIES

- Mating connector
- Cable assembly

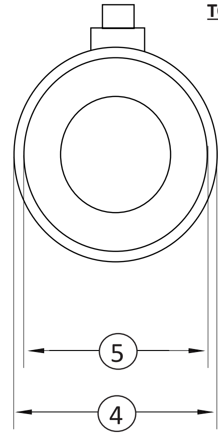
Interface
FORCE MEASUREMENT SOLUTIONS.

2160 HIGH CAPACITY COLUMN LOAD CELL (U.S. & METRIC)

SIDE VIEW



TOP VIEW



Dimensions

See Drawing	CAPACITY											
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	300K	1335	400K	1780	500K	2225	600K	2670	700K	3115	1000K	4450
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
(1)	16.50	419.1	19.00	482.6	21.26	540.0	23.25	590.6	25.50	647.7	27.80	706.1
(2)	3.75	95.3	4.00	101.6	4.50	114.3	5.00	127.0	5.50	139.7	6.50	165.1
(3)	3.75	95.5	4.00	101.6	4.50	114.3	5.00	127.0	5.50	139.7	6.50	165.1
(4)	5.50	139.7	5.50	139.7	6.00	152.4	7.00	177.8	7.50	190.5	9.50	241.3
(5)	5.00	127.0	5.00	127.0	5.50	139.7	6.50	165.1	7.00	177.8	9.00	228.6
(6)	3 ½-12	M76x2	3 ½-12	M90x2	4-12	M100x2	4 ½-8	M100x2	5-8	M125x4	6-8	M125x4

FORCE MEASUREMENT SOLUTIONS.

2161 HIGH CAPACITY COLUMN COMPRESSION ONLY LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 300K to 1000K (1335 to 4450 kN)
- Performance to ±0.15% FS
- Compact size
- Metric and English models
- Screw in handles

Specifications

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.15
Hysteresis – %FS		±0.10
Non-repeatability – %RO		±0.10
Creep, in 20 min – %		±0.05
TEMPERATURE		
Compensated Range	°F	+32 to +132
	°C	0 to +56
Operating Range	°F	-30 to +200
	°C	-34 to +93
Effect on Zero – %RO / °F		+0.003
Effect on Output – % / °F		+0.003
ELECTRICAL		
Rated Output – mV/V NOM		2.0
Excitation – VAC / VDC – NOM		10
Excitation – VAC / VDC - MAX		15
Bridge Resistance – Ohm NOM		350
Zero Balance – %RO		±1.0
Insulation Resistance – Megohm		> 5000
MECHANICAL		
Safe Overload – %CAP		150
Connector		MS3102A-14S-5P
Material		Alloy steel

STANDARD CONFIGURATION

Model 2161DQX-400K (Shown)

OPTIONS

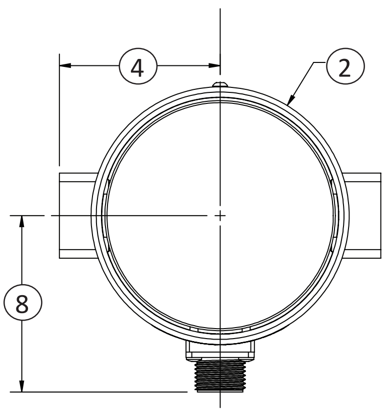
- Multiple bridge
- Standardized output
- ASTM E74 calibration
- Special thread size
- Handles

ACCESSORIES

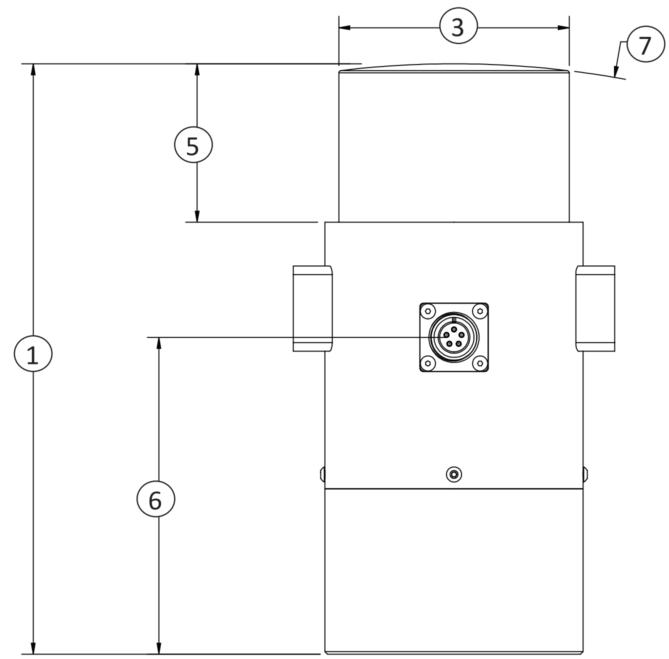
- Mating connector
- Cable assembly

2161 HIGH CAPACITY COLUMN COMPRESSION ONLY LOAD CELL (U.S. & METRIC)

TOP VIEW



SIDE VIEW



Dimensions

See Drawing	CAPACITY							
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	300K	1335	400K	1780	500K	2225	1000K	4450
	in	mm	in	mm	in	mm	in	mm
(1)	9.50	241.3	10.25	260.4	10.75	273.1	12.00	304.8
(2)	Ø3.50	Ø88.9	Ø4.50	Ø114.3	Ø4.50	Ø114.3	Ø6.50	Ø165.1
(3)	Ø3.00	Ø76.2	Ø4.00	Ø101.6	Ø4.00	Ø101.6	Ø6.00	Ø152.4
(4)	2.29	58.15	2.79	70.9	-	-	4.23	107.4
(5)	2.00	50.8	2.75	69.9	-	-	-	-
(6)	5.50	139.7	5.50	139.7	-	-	-	-
(7)	SR 15.75	SR 400.1	SR 16.50	SR 419.1	-	-	R 40.00	R 1016.0
(8)	2.59	65.8	3.06	77.8	-	-	4.25	108.0

![interface FORCE MEASUREMENT SOLUTIONS.]

2200 CALIBRATION COLUMN LOAD CELL (U.S. & METRIC)

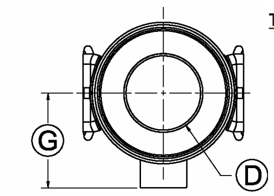
FEATURES & BENEFITS

- Capacities from 100K to 200K lbf (445 to 890 kN)
- Performance to <0.10%FS
- Quadruple the gages of Standard column cell
- Lightweight
- Compact
- E74 calibration

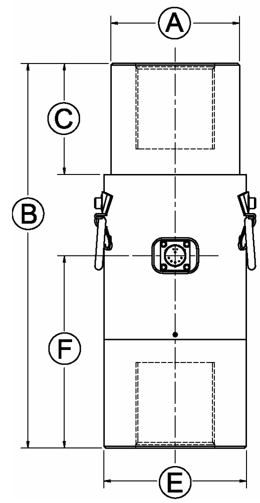
STANDARD CONFIGURATION

Model 2200 (Shown)

TOP VIEW



SIDE VIEW



Specifications

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.10
Hysteresis – %FS		±0.05
Nonrepeatability – %RO		±0.05
Creep, in 20 min – %		±0.05
TEMPERATURE		
Compensated Range	°F	+15 to +115
	°C	-9.4 to +46.1
Operating Range	°F	-30 to +175
	°C	-34.4 to +79.4
Effect on Zero – %RO / °F		0.003
Effect on Output – % / °F		0.003
ELECTRICAL		
Rated Output – mV/V (Nominal)		2.0 ± 0.20
Excitation – VAC / VDC – Nominal		10
Excitation – VAC / VDC MAX		15
Bridge Resistance – Ohm (Nominal)		350
Zero Balance – %RO		±1.0
Insulation Resistance – Megohm		> 5000
MECHANICAL		
Safe Overload – %CAP		150
Weight	lbs	35, 45
	kg	16, 20
Material		Stainless steel

OPTIONS

- Compression-only available (Ask factory for Specifications and Dimensions)
- Multiple bridge
- Standardized output
- ASTM E74 calibration
- Special thread size

ACCESSORIES

- Mating connector
- Cable assembly

Dimensions

See Drawing	MODEL			
	2230		2240	
	CAPACITY			
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	100K	445	200K	890
	in	mm	in	mm
(1)	3.0	76.2	4.5	114
(2)	10.1	257	13.5	343
(3)	2.75	70.0	3.9	99
(4)	1¾-12 UN 3B		2¾-8 UN 3B	
(5)	3.5	88.9	4.98	126.5
(6)	5.05	128.3	6.75	171.5
(7)	2.59	65.8	3.34	84.8

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

interface
FORCE MEASUREMENT SOLUTIONS.

2300 HIGH CAPACITY LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities 630, 1000, 1200, 2000 kN (140K, 225K, 270K, 450K lbf)
- Accuracy class 0.05% FS
- Tension & compression
- Low profile, small mass
- Flange mounted
- Dual bridge available

Specifications

CAPACITY		630	1000, 1200	2000
	METRIC (kN)	630	1000, 1200	2000
	U.S. (lbf)	140K	225K, 270K	450K
ACCURACY – (MAX ERROR)				
Static Error Band – %FS		±0.05		
Nonlinearlity – %FS		±0.05		
Hysteresis – %FS		±0.1		
Nonrepeatability – %RO		±0.05		
Creep, in 20 min – %		±0.025		
Side Load Sensitivity – %		±0.25		
Eccentric Load Sensitivity – % / mm		±0.02		
TEMPERATURE				
Compensated Range	°C	+10 to +60		
	°F	-12.2 to +15.6		
Operating Range	°C	+10 to +60		
	°F	-12.2 to +15.6		
Effect on Zero – %RO / °C MAX		0.0025		
ELECTRICAL				
Rated Output – mV/V (Nominal)		2		
Excitation Voltage – VDC MAX		20		
MECHANICAL				
Fatigue Range – %CAP		±80		
Weight	kg	70	100	140
	lbs	154	220	309

STANDARD CONFIGURATION

Model 2300 (Shown)

OPTIONS

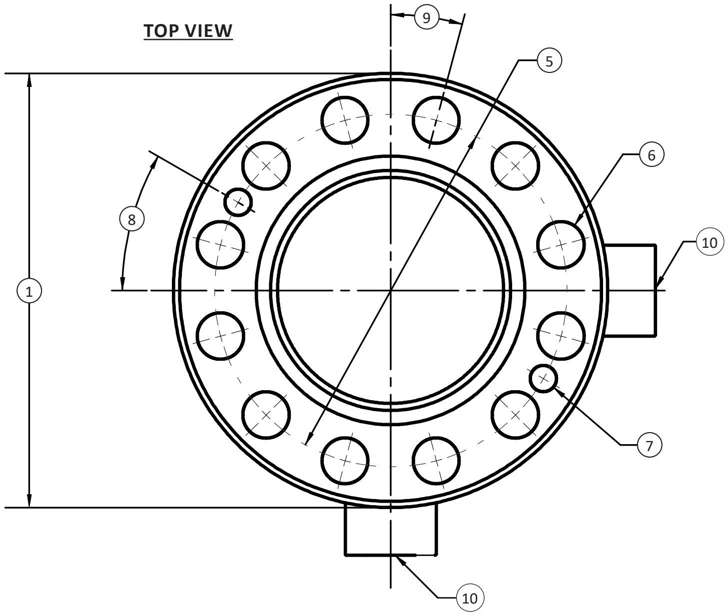
- Fixed cable or plug connection
- Redundancy: Dual bridge for axial force measurement
- TEDS calibration IEEE 1451.4

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

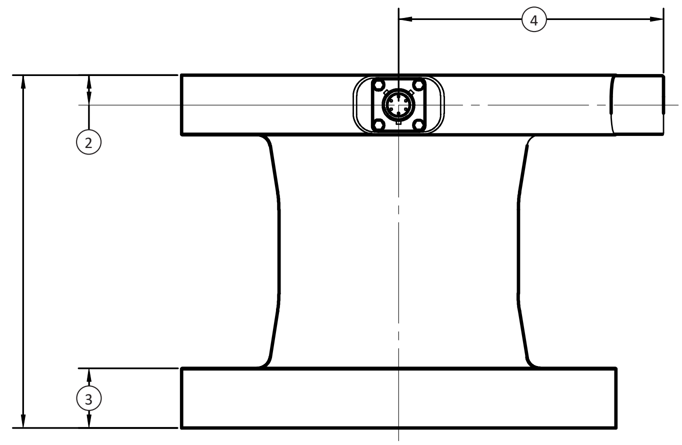
FORCE MEASUREMENT SOLUTIONS.

2300 HIGH CAPACITY LOAD CELL (U.S. & METRIC)

TOP VIEW



SIDE VIEW



Dimensions

See Drawings	MODEL					
	2330		2340		2350	
	CAPACITY					
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	140K	630	225K, 270K	1000, 1200	450K	2000
	in	mm	in	mm	in	mm
(1)	Ø7.76	Ø197	Ø9.45	Ø240.0	12.01	305.0
(2)	0.53	13.5	7.9	201	1.13	28.7
(3)	1.06 TYP	27 TYP	1.57 TYP	230 TYP	2.26 TYP	57.5 TYP
(4)	4.73 TYP	120.1 TYP	1.6 TYP	40 TYP	6.85 TYP	174.1 TYP
(5)	Ø6.3	Ø160	Ø7.87	Ø200	Ø9.84	Ø250.0
(6)	Ø0.83 THRU	Ø21.1 THRU	Ø1.00 THRU	Ø25.4 THRU	Ø1.28 THRU	Ø32.5 THRU
	12 Holes ES Spaces		12 Holes ES Spaces		12 Holes ES Spaces	
(7)	Ø0.47 H8 X ↧ 0.47	Ø(0.4735/0.4724) ↧ 11.9	Ø0.47 H8 X ↧ 0.47	Ø(0.4735/0.4724) ↧ 11.9	Ø0.47 H8 X ↧ 0.47	Ø(0.4735/0.4724) ↧ 11.9
	2 Holes ES Both Ends		2 Holes ES Both Ends		2 Holes ES Both Ends	
(8)	30°		30°		30°	
(9)	15°		15°		15°	
(10)	PT02E-10-6P Connector (Dual Bridge Option)		PT02E-10-6P Connector (Dual Bridge Option)		PT02E-10-6P Connector (Dual Bridge Option)	
(11)	PT02E-10-6P Connector (Primary Bridge)		PT02E-10-6P Connector (Primary Bridge)		PT02E-10-6P Connector (Primary Bridge)	

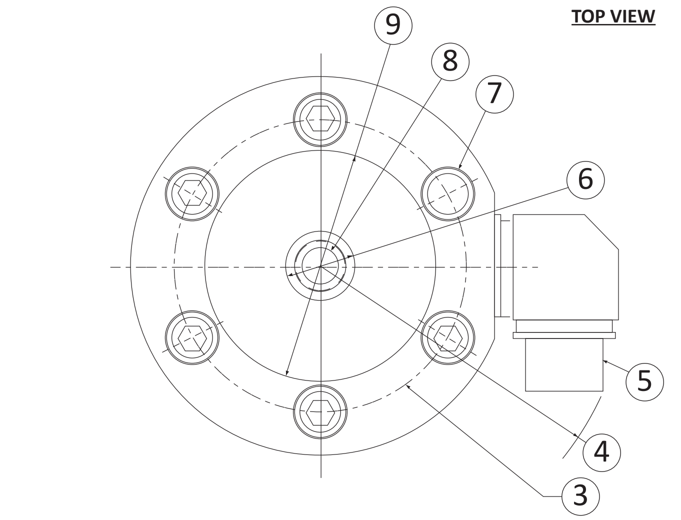
2400 STANDARD STAINLESS STEEL LOAD CELL (U.S. & METRIC)

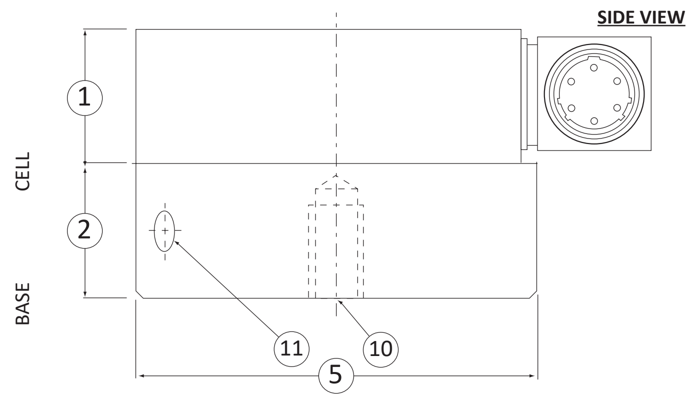
FEATURES & BENEFITS

- Capacities from 100 to 5K lbf (0.5 to 22 kN)
- Proprietary Interface Temperature compensated strain gages
- Stainless steel construction
- Hermetically sealed
- Tension and compression
- Compact size
- Counterbored mounting holes

STANDARD CONFIGURATION

Model 2420BLX-1000 (Shown)





(Shown with optional tension base)

Dimensions

See Drawing	MODEL			
	2420		2430	
	CAPACITY			
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	100, 250, 500, 1K	0.5, 1.25, 2.2, 4.5	2K, 5K	8.9, 22
	in	mm	in	mm
(1)	1.00	25.4	1.00	25.4
(2)	1.00	25.4	1.00	25.4
(3)	2.25	57.2	2.63	66.7
(4)	2.43	61.7	2.68	68.1
(5)	3.00	76.2	3.50	88.9
(6)	0.55	14.0	0.81	20.5
(7)	Counterbored for ¼-28 SHCS 6 Places		Counterbored for 5⁄16-24 SHCS 6 Places	
(8)	⅜-24 UNF-3B THRU		½-20 UNF-3B THRU	
(9)	1.81	46.0	2.07	52.5
(10)	⅜-24 UNF		½-20 UNF	
	↧0.70	↧17.8	↧0.70	↧17.8
(11)	Spanner holes 2 SPACED @ 180°			

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

Interface
FORCE MEASUREMENT SOLUTIONS.

2400 STANDARD STAINLESS STEEL LOAD CELL (U.S. & METRIC)

Specifications

PARAMETERS			MODEL	
			2420	2430
			CAPACITY	
Measuring Range	U.S. (lbf)		100, 250, 500, 1K	2K, 5K
	Metric (kN)		0.5, 1.25, 2.2, 4.5	8.9, 22
ACCURACY – (MAX ERROR)				
Static Error Band – %FS			±0.10	±0.10
Nonlinearity – %FS			±0.10	±0.10
Hysteresis – %FS			±0.08	±0.08
Nonrepeatability – %RO			±0.02	±0.02
Creep, in 20 min – %			±0.05	±0.05
Temperature				
Compensated Range		°F	+15 to +115	+15 to +115
		°C	-10 to +45	-10 to +45
Operating Range		°F	-65 to +200	-65 to +200
		°C	-55 to +90	-55 to +90
Effect on Zero – %RO / °F MAX			±0.002	±0.002
Effect on Output – %RO / °F MAX			±0.002	±0.002
ELECTRICAL				
Rated Output – mV/V (Nominal)			3.0	3.0
Excitation Voltage – VDC MAX			15	15
Bridge Resistance – Ohm (Nominal)			350	350
Zero Balance – %RO			±2.0	±2.0
Insulation Resistance – Megohm			5000	5000
MECHANICAL				
Safe Overload – %CAP			±150	±150
Deflection @ RO		in	0.003, 0.002, 0.002, 0.002	0.002
		mm	0.076, 0.051, 0.051, 0.051	0.051
Optional Base – P/N			B318-2	B319-2
Natural Frequency – kHz			2.2, 4.4, 6.0, 8.3	9.1, 11.7
Weight		lbs	1.5	2.0
		kg	0.68	0.91
Seal			Glass-metal hermetic	
Material			Stainless steel	

OPTIONS

- Submersible with integral cable
- Base (recommended)
- Transducer Electronic Data Sheet (TEDS)
- CU.S.tom calibration
- Special threads
- Special Temperature range

CONNECTOR OPTIONS

- PTWIH-10-6P

ACCESSORIES

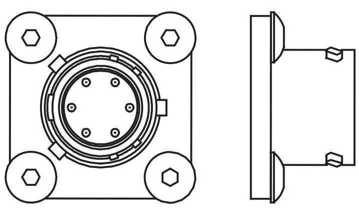
- Mating connector
- Instrumentation
- Loading hardware
- Mating cable

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

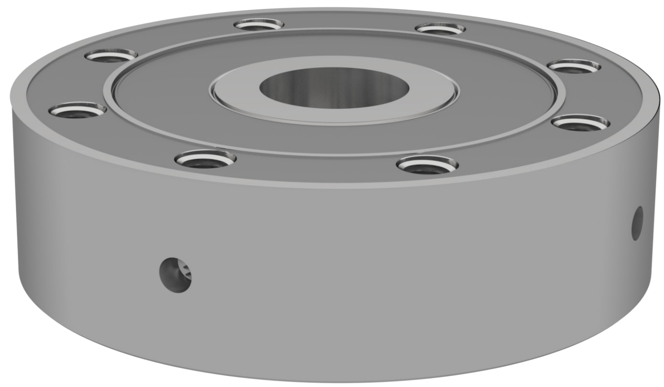
2400 STANDARD STAINLESS STEEL LOAD CELL (U.S. & METRIC)

BAYONET CONNECTOR

Model 2420BLX-1000



BASE



Model B3XXX

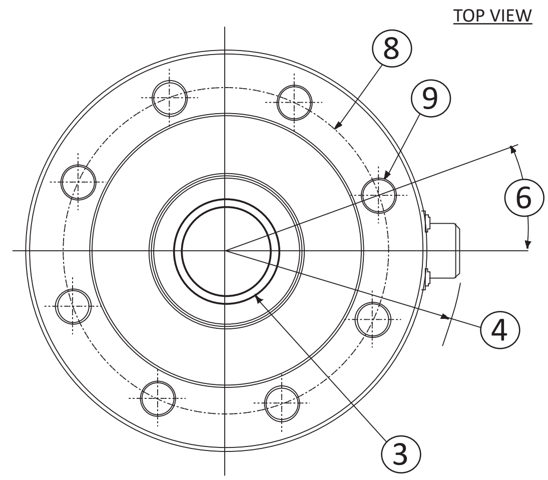
2400 HIGH CAPACITY STANDARD STAINLESS STEEL LOAD CELL (U.S. & METRIC)

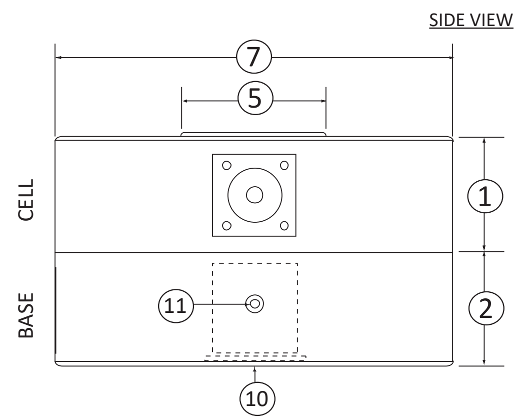
FEATURES & BENEFITS

- Capacities from 7.5K to 300K lbf (33.4 to 1350 kN)
- Proprietary Interface Temperature compensated strain gages
- Welded diaphragm
- Tension & compression
- Compact size
- Counterbored mounting holes in 10K lbf (44.5 kN) model

STANDARD CONFIGURATION

Model 2450BXM-50K (Shown)





Dimensions

See Drawing	MODEL							
	2440		2450		2470		2480	
	CAPACITY							
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	7.5K, 10K, 15K	33.4, 50, 75	20K, 50K	100, 250	150K, 200K	750, 1000	300K	1350
	in	mm	in	mm	in	mm	in	mm
(1)	1.80	45.7	1.80	45.7	2.50	63.5	4.25	108.0
(2)	1.75	44.5	1.75	44.5	2.50	63.5	4.25	108.0
(3)	1-14 UNS-3B		1 ½-12 UNF-3B		2.50-12 UN		3.50-8 UN	
(4)	Ø3.56	Ø85.2	Ø3.81	Ø96.8	Ø6.31	Ø160.3	Ø8.07	Ø205.0
(5)	Ø1.71	Ø43.5	Ø2.23	Ø56.6	Ø4.66	Ø118.3	Ø7.36	Ø186.9
(6)	22.5°		20.0°		11.25°		15°	
(7)	Ø5.50	Ø139.7	Ø6.00	Ø152.4	Ø11.00	Ø279.4	Ø14.00	Ø355.6
(8)	Ø4.50	Ø114.3	Ø4.88	Ø123.8	Ø9.50	Ø241.3	Ø11.75	Ø298.5
(9)	Ø0.41	Ø10.4	Ø0.53	Ø13.5	Ø0.78	Ø19.9	Ø1.03	Ø26.2
	8 places		8 places		12 places		12 places	
(10)	1-14 UNS-3B		1½-12 UNF-3B		2½-12 UN		3½-8 UN	
(11)	Spanner holes 4 SPACED @ 90°							

interface
FORCE MEASUREMENT SOLUTIONS.

2400 HIGH CAPACITY STANDARD STAINLESS STEEL LOAD CELL (U.S. & METRIC)

Specifications

PARAMETERS		MODEL							
		2440		2450		2470		2480	
		CAPACITY							
		U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
		7.5K, 10K, 15K	37.5, 50, 75	20K, 50K	100, 250	150K, 200K	750, 1000	300K	1350
ACCURACY – (MAX ERROR)									
Static Error Band – %FS		±0.10		±0.10		±0.10		±0.10	
Nonlinearity – %FS		±0.10		±0.10		±0.10		±0.10	
Hysteresis – %FS		±0.08		±0.08		±0.08		±0.08	
Nonrepeatability – %RO		±0.03		±0.03		±0.03		±0.03	
Creep, in 20 min – %		±0.03		±0.05		±0.03		±0.03	
TEMPERATURE									
Compensated Range	°F	+15 to +115		+15 to +115		+15 to +115		+15 to +115	
	°C	-10 to +45		-10 to +45		-10 to +45		-10 to +45	
Operating Range	°F	-65 to +200		-65 to +200		-65 to +200		-65 to +200	
	°C	-55 to +90		-55 to +90		-55 to +90		-55 to +90	
Effect on Zero – %RO / °F MAX		±0.0015		±0.0015		±0.0015		±0.0015	
Effect on Output – %RO / °F MAX		±0.0008		±0.0008		±0.0008		±0.0008	
Electrical									
Rated Output – mV/V (Nominal)		3.0		3.0		3.0		3.0	
Excitation Voltage – VDC MAX		20		20		20		20	
Bridge Resistance – Ohm (Nominal)		350		350		350		350	
Zero Balance – %RO		±2.0		±2.0		±2.0		±2.0	
Insulation Resistance – Megohm		5000		5000		5000		5000	
MECHANICAL									
Safe Overload – %CAP		±150		±150		±150		±150	
Deflection @ RO	in	0.003		0.004		0.010		0.010	
	mm	0.08		0.10		0.25		0.25	
Optional Base – P/N		B323-2		B320-1		N/A		N/A	
Natural Frequency – kHz		9.4		8.0		4.5		4.1	
Weight	lbs	6		9		46		130	
	kg	2.7		4.1		20.9		59	
Seal		Environmental							
Material		Stainless Steel		Stainless Steel		Stainless Steel		Carbon Steel	

OPTIONS

- Base (recommended)
- Transducer Electronic Data Sheet (TEDS)
- CU.S.tom calibration
- Special threads
- Special Temperature range
- Cable length
- Add connector to cable

CONNECTOR OPTIONS

- MS3102E-14S-6P

ACCESSORIES

- Mating connector
- Instrumentation
- Loading hardware

FORCE MEASUREMENT SOLUTIONS.

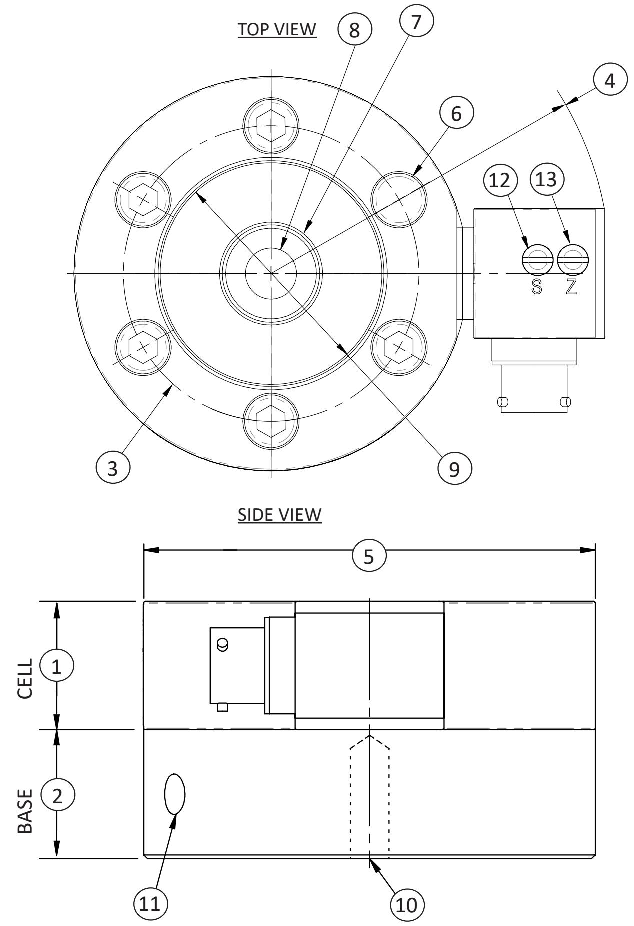
2404 STANDARD STAINLESS STEEL 2-WIRE AMPLIFIED LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 100 to 5K lbf (0.44 to 22.2 kN)
- Stainless steel construction
- Hermetically sealed
- Tension and compression
- Counterbored mounting holes
- Internally amplified with 4-20 mA output
- Proprietary Interface Temperature compensated strain gages

STANDARD CONFIGURATION

Model 2424CSY-500 (Shown)



Dimensions

See Drawing	MODEL			
	2424		2434	
	CAPACITY			
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	100, 250, 500, 1000	0.44, 1.11, 2.22, 4.45	2K, 5K	89, 22.2
	in	mm	in	mm
(1)	1	25.4	1	25.4
(2)	1	25.4	1	25.4
(3)	2.25	57.2	2.625	66.68
(4)	2.76	70.1	3.01	76.3
(5)	3	76.2	3.5	88.9
(6)	Counterbored for ¼-28 SHCS 6 Places		Counterbored for 5/16-24 SHCS 6 Places	
(7)	0.55	14	0.81	20.5
(8)	⅜-24 UNF-3B THRU		½-20 UNF-3B THRU	
(9)	1.81	46	2.07	52.5
(10)	⅜-24 UNF ↧ 0.70		½-20 UNF ↧ 0.70	
(11)	(2) Spanner holes spaced at 180°			
(12)	Span adjU.S.t			
(13)	Zero adjU.S.t			

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

FORCE MEASUREMENT SOLUTIONS.

2404 STANDARD STAINLESS STEEL 2-WIRE AMPLIFIED LOAD CELL (U.S. & METRIC)

Specifications

PARAMETERS			MODEL 2424	MODEL 2434
			CAPACITY	
Measuring Range	U.S. (lbf)		100, 250, 500, 1000	2K, 5K
	Metric (kN)		0.44, 1.11, 2.22, 4.45	89, 22.2
ACCURACY – (MAX ERROR)				
Nonlinearity – %FS			±0.10	±0.10
Hysteresis – %FS			±0.08	±0.08
Nonrepeatability – %RO			±0.03	±0.03
Creep, in 20 min – %			±0.05	±0.05
TEMPERATURE				
Compensated Range		°F	+15 to +115	+15 to +115
		°C	-10 to +45	-10 to +45
Operating Range		°F	-20 to +200	-20 to +200
		°C	-30 to +93	-30 to +93
Effect on Zero – %RO / °F MAX			±0.005	±0.005
Effect on Output – %RO / °F MAX			±0.009	±0.009
ELECTRICAL *RATED OUTPUT mA				
*Tension or Compression (unipolar)			+16.000 ±0.032	
*Universal Tension (bipolar)			+8.000 ±0.016	
*Universal Compression (bipolar)			-8.000 ±0.016	
Zero Balance			4.000 ±0.100 (unipolar) 12.000 ±0.100 (bipolar)	
Zero AdjU.S.tment			1 mA range	
Span AdjU.S.tment			5% range	
Supply Voltage range – VDC			9-28	
Bandwidth Hz			2000	
MECHANICAL				
Safe Overload – %CAP			±150	
Deflection @ RO		in	100: 0.003, 250 THRU 5K: 0.002	
		mm	0.44: 0.076, 1.11 THRU 22.2 : 0.051	
Optional Base – P/N			B319-2	
Natural Frequency – kHz			1.3, 2.2, 4.4, 6.0, 8.3, 9.1, 11.7	
Material			Stainless steel	

OPTIONS

- Base (recommended)
- Transducer Electronic Data Sheet (TEDS)
- CU.S.tom calibration
- Special threads
- Special Temperature range

CONNECTOR OPTIONS

- PTWIH-10-6P

ACCESSORIES

- Mating connector
- Instrumentation
- Loading hardware

Catalog 2019 06-15-2020

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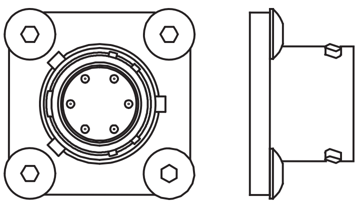
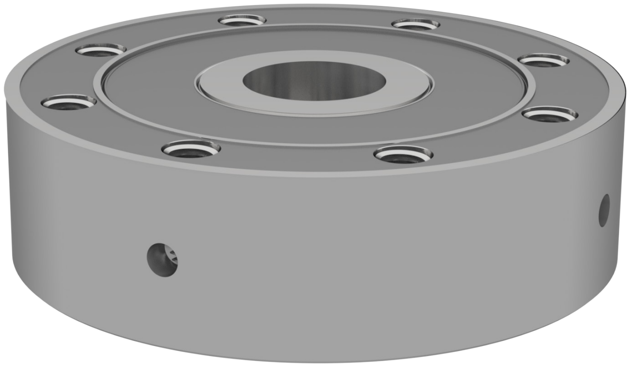
2404 STANDARD STAINLESS STEEL 2-WIRE AMPLIFIED LOAD CELL (U.S. & METRIC)

BAYONET CONNECTOR

Model 2424CSY-500 (Shown)



BASE



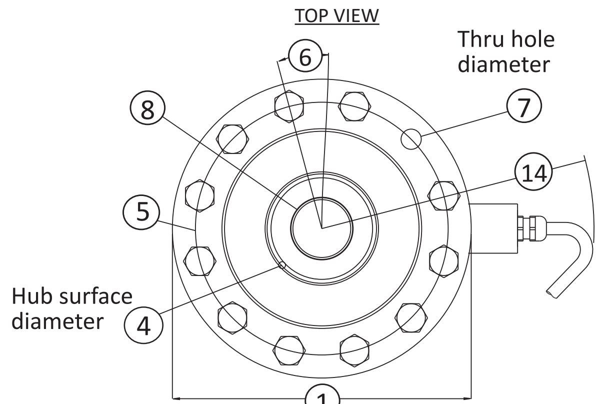
Model B24XX (Shown)

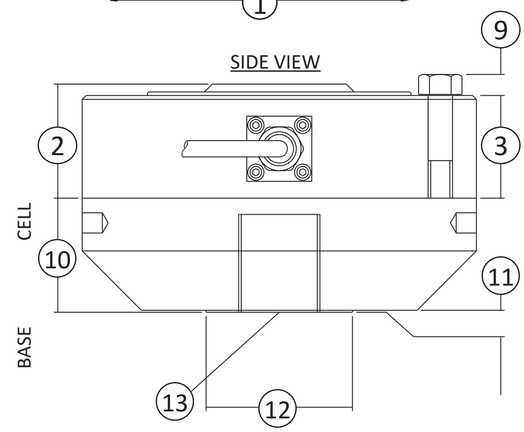
FORCE MEASUREMENT SOLUTIONS.

3200 STANDARD STAINLESS STEEL LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 2.5K to 100K lbf (12.5 to 445 kN)
- Proprietary Interface Temperature compensated strain gages
- Hermetically sealed cell
- Performance to 0.05%
- Compact size
- High 4 mV/V output
- Eccentric load compensated
- 0.0008%/°F temp. effect on output
- Low deflection
- Shunt calibration
- BaroMetric compensation





STANDARD CONFIGURATION

Model 3220BFG-50K (Shown)

Dimensions

See Drawing	MODEL					
	3210		3220		3232	
	CAPACITY					
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	2.5K, 5K, 10K	12.5, 25, 50	25K, 50K	111, 222	100K	445
	in	mm	in	mm	in	mm
(1)	Ø4.13	Ø104.9	Ø6.06	Ø153.9	Ø8.00	Ø203.2
(2)	1.38	35.1	1.75	44.5	2.50	63.5
(3)	1.20	30.5	1.58	40.0	2.20	55.9
(4)	Ø0.90	Ø22.9	Ø1.97	Ø50.0	Ø3.14	Ø79.8
(5)	Ø3.50	Ø88.9	Ø5.13	Ø130.3	Ø6.50	Ø165.1
(6)	22.5°	22.5°	15.0°	15.0°	11.25°	11.25°
(7)	Ø0.28	Ø7.10	Ø0.41	Ø10.4	Ø0.53	Ø13.5
	8 places		12 places		16 places	
(8)	⅝-18 UNF-3B		1 ¼-12 UNF-3B		1 ¾-12 UNF-3B	
	↧ 1.12	↧ 28.45	1.40	35.56	2.15	54.61
(9)	0.20	5.10	0.30	7.60	0.31	7.90
(10)	1.13	28.6	1.75	44.5	2.00	50.8
(11)	0.03	0.80	0.03	0.80	0.03	0.80
(12)	Ø1.25	Ø31.8	Ø2.25	Ø57.2	Ø3.00	Ø76.2
(13)	⅝-18 UNF-3B		1 ¼-12 UNF-3B		1 ¾-12 UNF-3B	
	↧ 0.87	↧ 22.1	↧ 1.40	↧ 35.56	↧ 1.75	↧ 44.45
(14)	4.80	121.9	5.52	140.2	5.30	134.6

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

interface
FORCE MEASUREMENT SOLUTIONS.

3200 STANDARD STAINLESS STEEL LOAD CELL (U.S. & METRIC)

Specifications

PARAMETERS			MODEL 3210	3210	3220	3220	3232
			CAPACITY				
Measuring Range	U.S. (lbf)		2.5K, 5K	10K	25K	50K	100K
	Metric (kN)		12.5, 25	50	111	222	445
ACCURACY – (MAX ERROR)							
Static Error Band – %FS			±0.05	±0.05	±0.05	±0.05	±0.06
Nonlinearity – %FS			±0.05	±0.05	±0.05	±0.05	±0.05
Hysteresis – %FS			±0.06	±0.06	±0.06	±0.06	±0.06
Nonrepeatability – %RO			±0.01	±0.01	±0.01	±0.01	±0.01
Creep, 20 min – %			±0.025	±0.025	±0.025	±0.025	±0.025
Side Load Sensitivity – %			±0.25	±0.25	±0.25	±0.25	±0.25
Eccentric Load Sensitivity – % / in			±0.25	±0.25	±0.25	±0.25	±0.25
TEMPERATURE							
Compensated Range		°F	+15 to +115	+15 to +115	+15 to +115	+15 to +115	+15 to +115
		°C	-10 to +45	-10 to +45	-10 to +45	-10 to +45	-10 to +45
Operating Range		°F	-65 to +200	-65 to +200	-65 to +200	-65 to +200	-65 to +200
		°C	-55 to +90	-55 to +90	-55 to +90	-55 to +90	-55 to +90
Effect on Zero – %RO / °F MAX			±0.0008	±0.0008	±0.0008	±0.0008	±0.0008
Effect on Output – %RO / °F MAX			±0.0008	±0.0008	±0.0008	±0.0008	±0.0008
ELECTRICAL							
Rated Output – mV/V (Nominal)			2.0 / 4.0	4.0	4.0	4.0	4.0
Excitation Voltage – VDC MAX			20	20	20	20	20
Bridge Resistance – Ohm (Nominal)			350	350	350	350	350
Zero Balance – %RO			±1.0	±1.0	±1.0	±1.0	±1.0
Insulation Resistance – Megohm			5000	5000	5000	5000	5000
MECHANICAL							
Safe Overload – %CAP			±150	±150	±150	±150	±150
Deflection @ RO		in	0.002	0.002	0.002	0.002	0.003
		mm	0.05	0.05	0.05	0.05	0.08
Optional Base – P/N			B302	B302	B303	B303	B312
Natural Frequency – kHz			6.6	9.4	6.5	7.0	5.8
Weight		lbs	3.3	3.3	9.5	9.5	26
		kg	1.5	1.5	4.3	4.3	11.8
Calibration			T & C				
Material			Stainless steel				

OPTIONS

- Base (recommended)
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- CU.S.tom calibration
- Multiple bridge
- Special threads
- Special Temperature range
- Cable length
- Add connector to cable

CONNECTOR OPTIONS

- Integral Cable – 20 ft (6 m)

ACCESSORIES

- Instrumentation
- Loading hardware

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

3200 STANDARD STAINLESS STEEL LOAD CELL (U.S. & METRIC)

INTEGRAL 20 FT. CABLE CONNECTOR

Model 3220XXX

BASE

Model B32XX

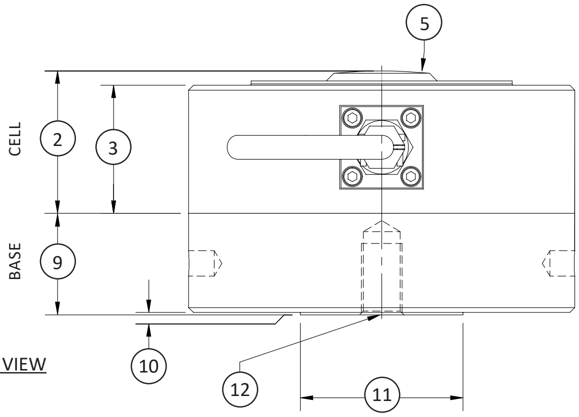
3201 STANDARD STAINLESS STEEL LOAD CELL COMPRESSION-ONLY (U.S. & METRIC)

FEATURES & BENEFITS

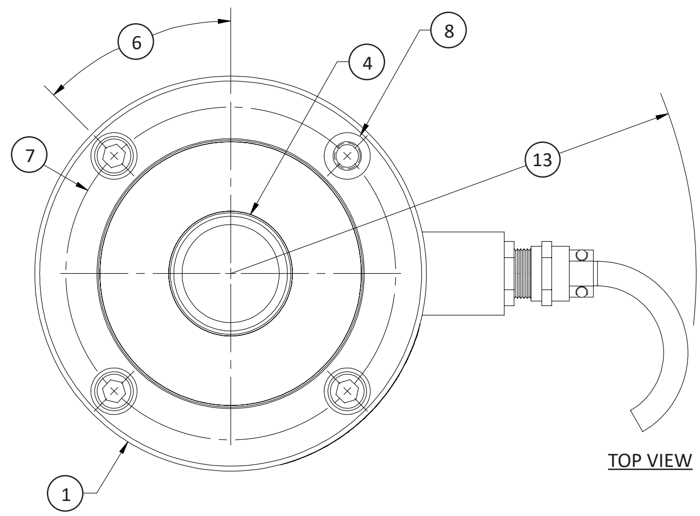
- Capacities from5K to 100K lbf (25 to 450 kN)
- Proprietary Interface Temperature compensated strain gages
- Hermetically sealed cell
- Performance to 0.04%
- Compact size
- High 4 mV/V output
- Eccentric load compensated
- 0.0008%/°F temp. effect on output
- Low deflection
- Shunt calibration
- BaroMetric compensation

STANDARD CONFIGURATION

Model 3221BBE-50K (Shown without base)



SIDE VIEW



TOP VIEW

Dimensions

See Drawing	MODEL					
	3211		3221		3231	
	CAPACITY					
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	2.5K, 5K, 10K	11.1, 25, 50	25K, 50K	10, 250	100K	450
	in	mm	in	mm	in	mm
(1)	Ø4.13	Ø104.9	Ø4.75	Ø120.7	Ø7.50	Ø203.2
(2)	1.38	35.1	1.75	44.4	2.25	57.2
(3)	1.20	30.5	1.58	40.1	1.95	49.5
(4)	Ø0.90	Ø22.9	Ø1.19	Ø30.2	Ø2.67	Ø67.8
(5)	SR 6.00	SR 152.4	SR 6.00	SR 152.4	SR 8.00	SR 203.2
(6)	22.5°		45.0°		15.0°	
(7)	Ø3.50	Ø88.9	Ø4.00	Ø101.6	Ø6.25	Ø158.8
(8)	¼-28 x 1¼ 8 places		5/16-24 x 1½ 4 places		7/16-20 x 2 12 places	
(9)	1.13	28.7	1.25	31.8	2.00	50.8
(10)	0.03	0.8	0.03	0.8	0.03	0.8
(11)	Ø1.25	Ø31.8	Ø2.00	Ø50.8	Ø3.00	Ø76.2
(12)	⅝-18 UNF-3B ↧0.87	M16 x 2-4H ↧22.1	½-20 UNF-3B ↧0.88	M16 x 2-6H ↧22.4	1 ¾-12 UNF-3B ↧1.75	M27 x 2-6H ↧44.5
(13)	2.52	64	3.00	76.2	4.34	110.2

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

interface
FORCE MEASUREMENT SOLUTIONS.

3201 STANDARD STAINLESS STEEL LOAD CELL COMPRESSION-ONLY (U.S. & METRIC)

Specifications

PARAMETERS			MODEL				
			3211	3211	3221	3221	3231
			CAPACITY				
Measuring Range	U.S. (lbf)		2.5K, 5K	10K	25K	50K	100K
	Metric (kN)		11.1, 25	50	100	250	450
ACCURACY – (MAX ERROR)							
Static Error Band – %FS			±0.04	±0.04	±0.04	±0.04	±0.04
Nonlinearity – %FS			±0.05	±0.05	±0.05	±0.05	±0.05
Hysteresis – %FS			±0.06	±0.06	±0.06	±0.06	±0.06
Nonrepeatability – %RO			±0.01	±0.01	±0.01	±0.01	±0.01
Creep, 20 min – % ±0.025			±0.025	±0.025	±0.025	±0.025	±0.025
Side Load Sensitivity – %			±0.25	±0.25	±0.25	±0.25	±0.25
Eccentric Load Sensitivity – %		in	±0.25	±0.25	±0.25	±0.25	±0.25
		mm	±6.4	±6.4	±6.4	±6.4	±6.4
TEMPERATURE							
Compensated Range		°F	+15 to +115	+15 to +115	+15 to +115	+15 to +115	+15 to +115
		°C	-10 to +45	-10 to +45	-10 to +45	-10 to +45	-10 to +45
Operating Range		°F	-65 to +200	-65 to +200	-65 to +200	-65 to +200	-65 to +200
		°C	-55 to +90	-55 to +90	-55 to +90	-55 to +90	-55 to +90
Effect on Zero – %RO / °F MAX			±0.0008	±0.0008	±0.0008	±0.0008	±0.0008
Effect on Output – %RO / °F MAX			±0.0008	±0.0008	±0.0008	±0.0008	±0.0008
ELECTRICAL							
Rated Output – mV/V (Nominal)			2.0, 4.0	4.0	4.0	4.0	4.0
Excitation Voltage – VDC MAX			20	20	20	20	20
Bridge Resistance – Ohm (Nominal)			350	350	350	350	350
Zero Balance – %RO			±1.0	±1.0	±1.0	±1.0	±1.0
Insulation Resistance – Megohm			5000	5000	5000	5000	5000
MECHANICAL							
Safe Overload – %CAP			±150	±150	±150	±150	±150
Deflection @ RO		in	0.002	0.002	0.002	0.002	0.003
		mm	0.051	0.051	0.051	0.051	0.076
Optional Base – P/N			B302	B302	B306	B306	B304
Natural Frequency – kHz			6.1	8.6	8.2	11.7	7.6
Weight		lbs	3.3	3.3	6.8	6.8	13.5
		kg	1.5	1.5	3.08	3.08	6.12
Calibration			Compression				
Material			Stainless Steel				

OPTIONS

- Base (Recommended)
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- CU.S.tom calibration
- Multiple bridge
- Special threads
- Special Temperature range
- Cable length
- Add connector to cable

ACCESSORIES

- Instrumentation
- Loading hardware

BASE

Model B32XX

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

A4200 & A4600 WEIGHCHECK LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacity ranges from 2.5K to 50K lbf (11.1 to 222 kN)
- High output – 4 mV/V
- Self-centering in all directions
- High safe side load – to 400%
- Standardized output – ±0.1%
- Zinc plated (A4200) or stainless steel (A4600)
- Factory assembled for easy field installation
- Static/dynamic/in-motion capabilities
- Low height – 4.0 in (101.6 mm) for 2.5K, 5K, 10K (11.1, 22.2, 44.5 kN); 5.0 in (127 mm) for 25K, 50K lbf (111, 222 kN)

SPECIFICATIONS

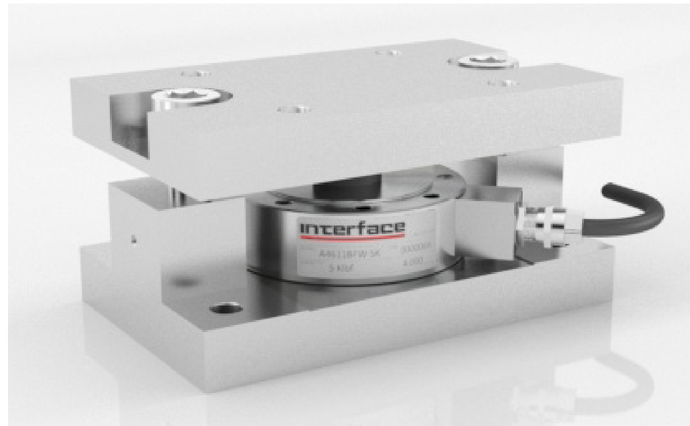
ACCURACY – (MAX ERROR)		
Static Error Band – %FS		± 0.05
Nonlinearity – %FS		± 0.05
Hysteresis – %FS		± 0.03
Nonrepeatability – %RO		± 0.02
Creep, in 20 min – %		± 0.025
TEMPERATURE		
Compensated Range	°C	-10 to +45
	°F	+15 to +115
Operating Range	°C	-55 to +90
	°F	-65 to +200
Effect on Output – % / °F MAX		±0.0008
Effect on Zero – %RO / °F MAX		±0.0008
ELECTRICAL		
Rated Output – mV/V	2.5K lbf (11.1 kN)	2.000 ±0.1%
	5K-50K lbf (22.2-222 kN)	4.000 ±0.1%
Zero Balance – %RO		±1.0
Bridge Resistance – Ohms		350
Excitation Voltage – VDC MAX		20
Insulation Resistance – Megohm		5000
MECHANICAL		
Calibration		Compression
Safe Overload – % CAP		150
Cable length	ft	30
	m	9.1
Material	A4200	Zinc plated
	A4600	Stainless steel plated

OPTIONS*

- Zinc plated (A4200)
- Stainless steel (A4600)
- Special cable length

See appendix for more technical info.

STANDARD CONFIGURATION



MODEL A4200 & A4600 (Shown)

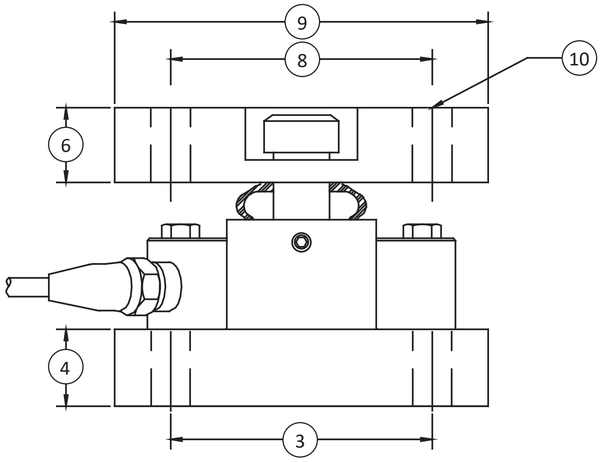
Mount Model	Material	Range		Safe Side Load		
		lbf	kN	lbs	kg	(% range)
M4200-1	Alloy	5K	22.2	20K	9,072	400
M4200-1	Alloy	10K	44.5	20K	22.7K	200
M4200-2	Alloy	25K	111	50K	22.8K	200
M4200-2	Alloy	50K	222	50K	22.8K	100
M4600-1	Stainless	5K	22.2	10K	4,536	200
M4600-1	Stainless	10K	44.5	10K	4,536	100
M4600-2	Stainless	25K	111	25K	11.3	100
M4600-2	Stainless	50K	222	25K	11.3	50

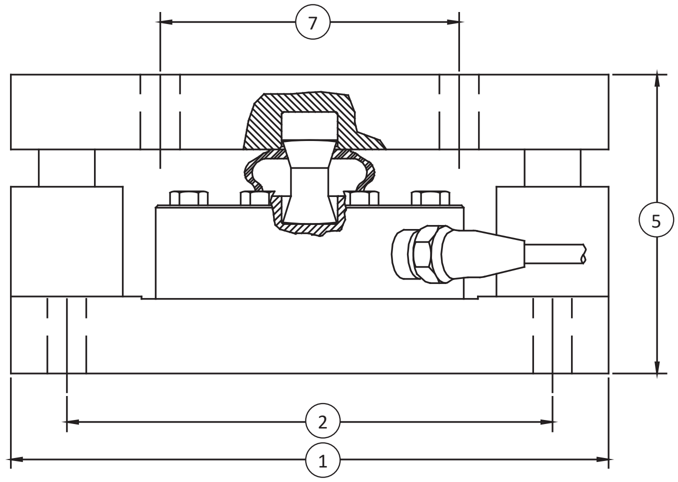
ACCESSORIES

- 9300
- 9390
- UMC600
- SGA
- Junction box

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

A4200 & A4600 WEIGHCHECK LOAD CELL (U.S. & METRIC)





DIMENSIONS

See Drawing	CAPACITY			
	A4211, A4611		A4221, A4621	
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	2.5K, 5K, 10K	11.1, 22.2, 44.5	25K, 50K	111, 222
	in	mm	in	mm
(1)	8.00	203.2	10.00	254.0
(2)	6.50	165.1	7.75	196.9
(3)	3.50	88.9	4.50	114.3
(4)	1.00	25.4	1.25	31.8
(5)	4.00	101.6	5.00	127.0
(6)	1.00	25.4	1.25	31.8
(7)	4.00	101.6	5.00	127.0
(8)	3.50	88.9	4.50	114.3
(9)	5.00	127.0	6.00	152.4
(10)	0.52	13.2	0.78	19.8

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

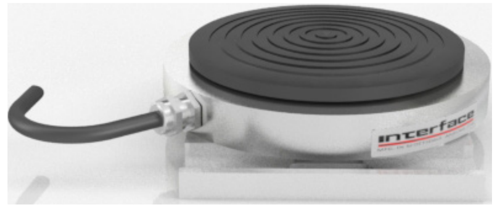
FORCE MEASUREMENT SOLUTIONS.

BPL BRAKE PEDAL LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Lowest nonlinearity and hysteresis of any brake pedal load cell – < 0.05%
- Ultra low height
- Low sensitivity to off-center loads – < 1.0% / in
- Mounts directly to pedal with included strap(s)
- Interchangeable mounting plates
- Storage case included
- For U.S.e with gas, brake or clutch pedal
- Storage case included

STANDARD CONFIGURATION



Model BPL (Shown)

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Static Error Band		±0.05
Nonlinearity – %FS		±0.05
Hysteresis – %FS		±0.05
Nonrepeatability – %RO		±0.02
Creep, in 20 min – %		±0.05
Eccentric Load Sensitivity – % / in		±1
TEMPERATURE		
Compensated Range	°F	+15 to +115
	°C	-10 to +45
Operating Range	°F	-65 to +200
	°C	-55 to +90
Effect on Output – % / °F MAX		±0.001
Effect on Zero – %RO / °F MAX		±0.002
ELECTRICAL		
Rated Output – mV/V (Nominal)		2.0
Zero Balance – %RO		±1.0
Bridge Resistance – Ohm (Nominal)		700
Excitation Voltage – VDC	MAX	15
	Nominal	10
Insulation Resistance – Megohm		> 5000
Deflection at Capacity	in	0.002
	mm	0.051
MECHANICAL		
Calibration		Compression
Safe Overload – %CAP		150
Safe Overload – Side – %CAP		40, any direction
Material		Aluminum

OPTIONS

- Cable length
- CU.S.tom calibration
- Special Temperature range
- Add connector to cable
- Standardized output
- Transducer Electronic Data Sheet (TEDS)

ACCESSORIES

- Instrumentation

CONNECTOR OPTIONS

- 10 ft (3 m) integral cable

Catalog 2019 06-15-2020

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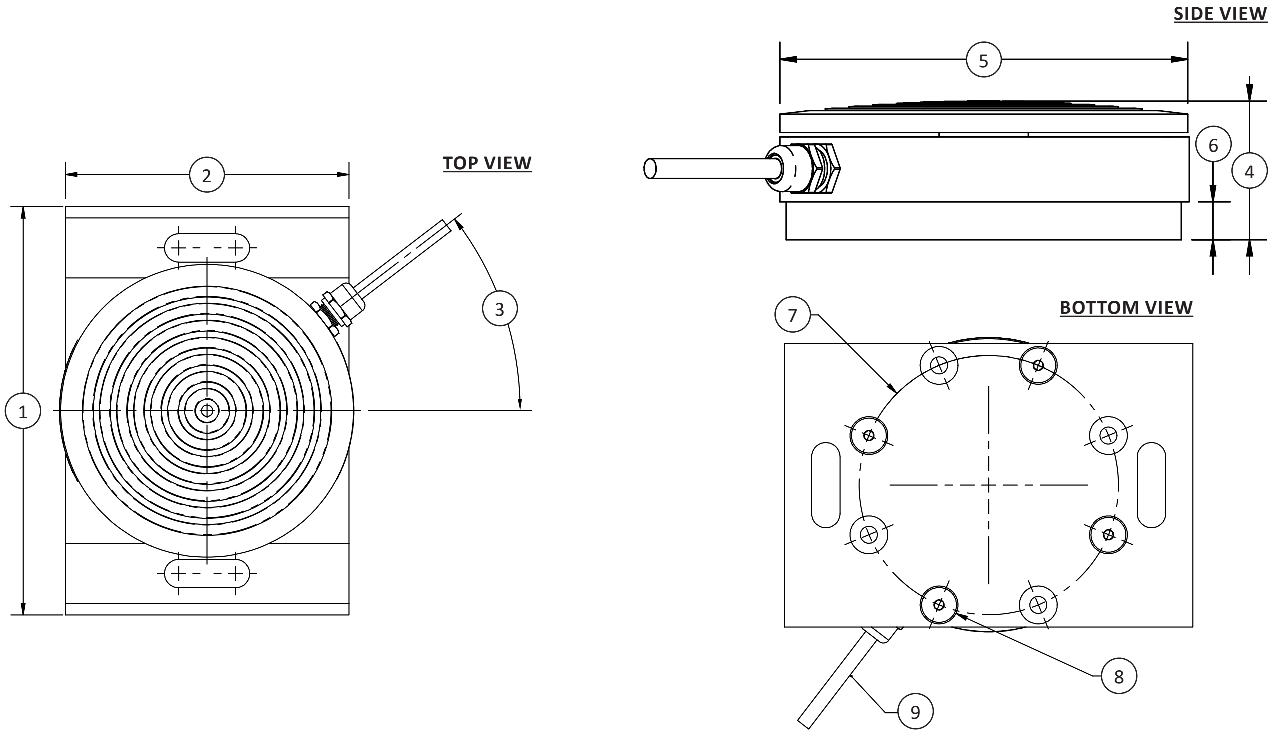
BPL PEDAL LOAD CELL (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITY	
	U.S. (lbf)	Metric (N)
	50, 100, 200, 300, 500	222, 445, 890, 1.33K, 2.22K
	in	mm
(1)	3.60	91.4
(2)	2.50	63.5
(3)	37.5°	
(4)	0.88	22.3
(5)	Ø2.58	Ø65.5
(6)	0.24	6.1
(7)	Ø2.285	Ø58.04
(8)	4 x 6-32 UNC	
(9)	Ø0.13	Ø3.3

Notes:

Mini Load Cells

LowProfile®

Load Button

Load Washer

Mini Beam

Column

Rod End

S-Type

Platform

FORCE MEASUREMENT SOLUTIONS.

LBM COMPRESSION LOAD BUTTON (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 25 to 50K lbf (0.11 to 222 kN)
- Temperature compensated
- Integral load button
- Small diameter
- Environmentally sealed

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.5
Hysteresis – %FS		±0.3
Nonrepeatability – %RO		±0.10
TEMPERATURE		
Compensated Range	°F	+70 to +170
	°C	+21 to +77
Operating Range	°F	-65 to +200
	°C	-54 to +93
Effect on Zero – %RO / °F MAX		±0.005
Effect on Output – %RO / °F MAX		±0.005
Zero Balance – %FS		±2.0
ELECTRICAL		
Rated Output – mV/V (nominal)		2.0
Bridge Resistance – Ohm (nominal)		350
Excitation Voltage – VDC MAX		10
MECHANICAL		
Calibration		Comp.
Deflection		0.001-0.003
Safe Overload – %CAP		150
Ultimate Overload % of CAP Cable		300
Material		Stainless steel

STANDARD CONFIGURATION

Model LBM-5K (Shown)

OPTIONS

- CU.S.tom calibration
- Standardized output
- Special Temperature range
- Cable length
- Add connector to cable
- Transducer Electronic Data Sheet (TEDS)

ACCESSORIES

- Instrumentation

CONNECTOR OPTIONS

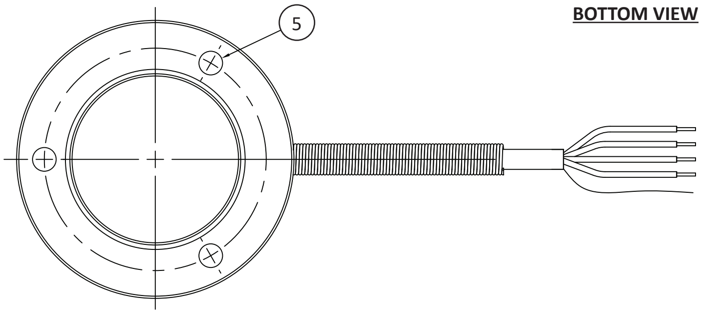
- 5 ft (1.5 m) integral cable (LBM)

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

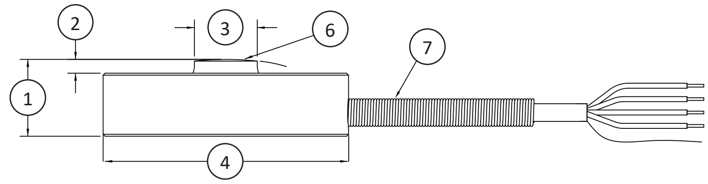
FORCE MEASUREMENT SOLUTIONS

LBM COMPRESSION LOAD BUTTON (U.S. & METRIC)

BOTTOM VIEW



SIDE VIEW



Dimensions

See Drawing	CAPACITY									
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	25, 50, 100	0.11, 0.22, 0.44	250, 500, 1K, 2K	1.11, 2.22, 4.45, 8.9	5K, 10K	22.2, 44.5	20K	89	50K	222
	in	mm	in	mm	in	mm	in	mm	in	mm
(1)	0.63	16.0	0.39	9.90	0.63	16.0	1.0	25.4	1.50	38.1
(2)	0.05	1.30	0.07	1.80	0.08	2.00	0.12	3.00	0.18	4.60
(3)	0.21	5.30	0.32	8.10	0.43	10.9	0.60	15.0	0.78	19.8
(4)	1.00	25.4	1.25	31.8	1.50	38.1	2.00	50.8	3.00	76.2
(5)	(4-40) UNC ↧0.19 EQ SP Ø0.75 B.C.	(4-40) UNC ↧4.83 EQ SP Ø19.0 B.C.	(6-32) UNC ↧0.25 EQ SP Ø1.00 B.C.	(6-32) UNC ↧6.35 EQ SP Ø25.4 B.C.	(6-32) UNC ↧0.25 EQ SP Ø1.25 B.C.	(6-32) UNC ↧6.35 EQ SP Ø31.8 B.C.	(6-32) UNC ↧0.25 EQ SP Ø1.63 B.C.	(6-32) UNC ↧6.35 EQ SP Ø41.3 B.C.	(6-32) UNC ↧0.25 EQ SP Ø2.38 B.C.	(6-32) UNC ↧6.35 EQ SP Ø60.3 B.C.
	3 Places									
(6)	Sphercial load button									
(7)	Stainless steel spring strain relief									

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

LBMP OVERLOAD PROTECTED COMPRESSION LOAD BUTTON (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 0.01 to 100 kN (2.25 to 22.5K lbf)
- Overload protected
- Temperature compensated
- Small diameter
- Environmentally sealed
- Stainless steel

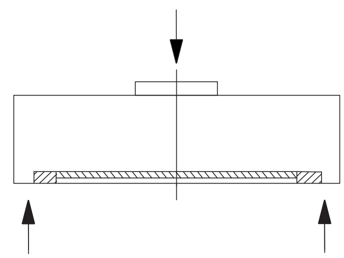
Specifications

ACCURACY – (MAX ERROR)			
Nonlinearity – %FS			±0.5
Hysteresis – %FS			±0.5
Nonrepeatability – %RO			±0.2
Creep, in 30 min – %			±0.1
TEMPERATURE			
Effect on Zero – %RO / °C			±0.02
Effect on Output – %RO / °C			±0.02
Compensated Range		°C	0 to +60
		°F	+32 to +140
Operating Range		°C	-10 to +70
		°F	+14 to +158
ELECTRICAL			
Output – mV/V ± %		(0.01 kN)	0.5 ± 20
		(2.25 lbf)	
		(0.02-100 kN)	1 ± 20
		(4.5-22.5K lbf)	
Excitation Voltage – VDC		(0.01 - 0.05 kN)	2 - 6
		(2.25-11.2 lbf)	
		(0.1 - 100 kN)	2 - 12
		(22.5-22.5K lbf)	
Bridge Resistance – Ohm			350
MECHANICAL			
Safe Overload – %CAP		(0.01 - 0.2 kN)	500
		(0.5 - 100 kN)	300
Deflection at Rated Capacity		mm	< 0.15
		in	< 0.006
IP Rating		(0.01 - 0.02 kN)	IP60
		(0.05 - 100 kN)	IP65
Net Weight	kg	(0.01-10 kN)	0.3
	lbs	(2.25-2.25K lbf)	0.66
	kg	(20 kN)	0.4
	lbs	(4.5K lbf)	0.88
	kg	(50 kN)	0.7
	lbs	(11.2K lbf)	1.54
	kg	(100 kN)	1.7
	lbs	(22.5K)	3.75
Material			Stainless steel

STANDARD CONFIGURATION

Model LBMP-50K (Shown)

LOADING DIAGRAM



OPTIONS

- Special Temperature range
- Internal shunt resistor – 100% output
- Standardized output
- Cable length
- Add connector to cable
- Transducer Electronic Data Sheet (TEDS)
- CU.S.tom calibration

CONNECTOR OPTIONS

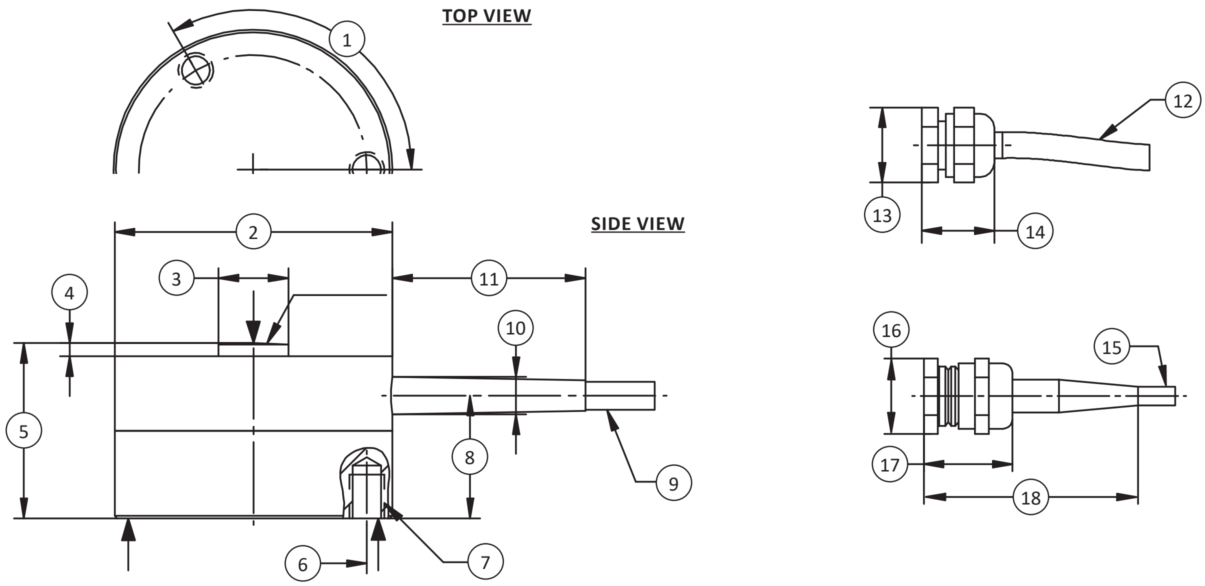
- 3 m (10 ft) integral cable

ACCESSORIES

- Instrumentation

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

LBMP OVERLOAD PROTECTED COMPRESSION LOAD BUTTON (U.S. & METRIC)



Dimensions

See Drawing	CAPACITY							
	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)
	0.01, 0.02, 0.05, 0.1, 0.2, 0.5, 1, 2, 5, 10	2.25, 4.50, 11.2, 22.5, 45, 112, 225, 450, 1.12K, 2.25K	20	4.5K	50	11.2K	100	22.5K
	mm	in	mm	in	mm	in	mm	in
(1)	3 x 120°							
(2)	32 (+0.2)	1.3 (+0.008)	39 (+0.2)	1.5 (+0.008)	52 (+0.2)	2.0 (+0.008)	79 (+0.2)	3.1 (+0.008)
(3)	8	0.3	11	0.4	15	0.6	20	0.8
(4)	1.8 (±0.2)	0.1 (±0.008)	2 (±0.2)	0.1 (±0.008)	3 (±0.2)	0.1 (±0.008)	5 (±0.2)	0.2 (±0.008)
(5)	20 (±0.2)	0.8 (±0.008)	24 (±0.2)	0.9 (±0.008)	40 (±0.2)	1.6 (±0.008)	50 (±0.2)	2.0 (±0.008)
(6)	26 (±0.1)	1.0 (±0.004)	32 (±0.1)	1.3 (±0.004)	42 (±0.1)	1.7 (±0.004)	65 (±0.1)	2.6 (±0.004)
(7)	M4 ↧ 5	0.1574 ↧ 0.2	M3 ↧ 5	0.1181 ↧ 0.2	M4 ↧ 5	0.1574 ↧ 0.2	M5 ↧ 6	0.1968 ↧ 0.2
(8)	14	0.6	12.5	0.49	25	1.0	21	0.8
(9)	Ø3.2	Ø0.13	–	–	–	–	–	–
(10)	Ø4.2	Ø0.17	Ø4.2	Ø0.17	Ø4.2	Ø0.17	Ø4.2	Ø0.17
(11)	22	0.9	22	0.9	22	0.9	22	0.9
(12)	–	–	Ø3.2	Ø0.13	–	–	–	–
(13)	Ø10	Ø0.4	Ø10	Ø0.4	Ø10	Ø0.4	Ø10	Ø0.4
(14)	9	0.4	9	0.4	9	0.4	9	0.4
(15)	–	–	–	–	Ø4.6	Ø0.18	Ø4.6	Ø0.18
(16)	Ø17	Ø0.7	Ø17	Ø0.7	Ø17	Ø0.7	Ø17	Ø0.7
(17)	19	0.7	19	0.7	19	0.7	19	0.7
(18)	46	1.8	46	1.8	46	1.8	46	1.8

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

LBMU HIGH ACCURACY COMPRESSION LOAD BUTTON (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 100 - 1K lbf (0.45 - 4.45 kN)
- Temperature compensated
- Superior to any other load button
- Stainless steel
- Enhanced eccentric load rejection
- Low power

Specifications

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.15
Hysteresis – %FS		±0.15
Nonrepeatability – %RO		±0.05
TEMPERATURE		
Compensated Range	°F	+70 to +170
	°C	+20 to +75
Operating Range	°F	-65 to +200
	°C	-55 to +90
Effect on Zero – %RO / °F MAX		±0.0005
Effect on Output – % / °F MAX		±0.0002
Zero Balance – %FS		±2.0
ELECTRICAL		
Rated Output – mV/V (Nominal)		2.0
Bridge Resistance – Ω (Nominal)		700
Excitational Voltage – VDC		5
MECHANICAL		
Safe Overload – %CAP		150
Calibration		Compression
Ultimate Overload – %CAP		300
Deflection	in	0.001 - 0.003
	mm	0.025 - 0.076
Cable Type		4-Conductor
Material		Stainless steel

OPTIONS

- Cable length
- Standardized output
- CU.S.tom calibration
- Add connector to cable
- Special Temperature range
- Transducer Electronic Data Sheet (TEDS)

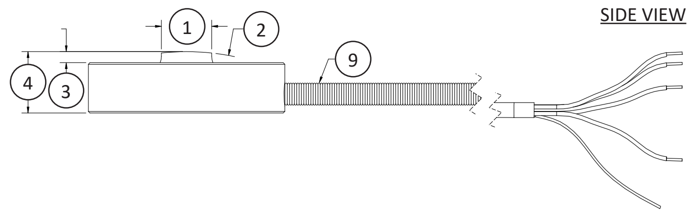
CONNECTOR OPTIONS

- 5 ft (1.5 m) integral cable

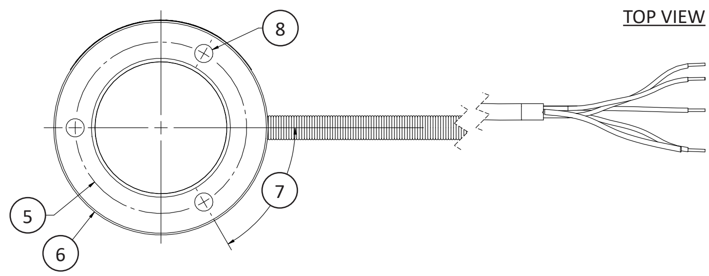
STANDARD CONFIGURATION

Model LBMU (Shown)

SIDE VIEW



TOP VIEW



Dimensions

See Drawing	CAPACITY	
	U.S. (lbf)	Metric (kN)
	100, 250, 500, 1K	0.45, 1.10, 2.20, 4.45
	in	mm
(1)	Ø0.32	Ø8.1
(2)	1.50	38.1
(3)	0.07	1.8
(4)	0.39	9.9
(5)	1.00	25.4
(6)	1.25	31.8
(7)	60° ± 3°	
(8)	3 x (6-32) UNC-2B ↧ 0.25 EQ SP	3 x (M3.5x0.6) ↧ 6.4 EQ SP
(9)	Ø0.15 Spring O.D.	Ø3.81 Spring O.D.

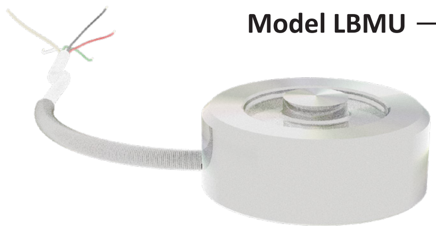
ACCESSORIES

- Instrumentation

Interface
FORCE MEASUREMENT SOLUTIONS

LBMU HIGH ACCURACY COMPRESSION LOAD BUTTON (U.S. & METRIC)

SAMPLE SYSTEM OVERVIEW



Model LBMU

SGA
CSC
DMA
CSD
OEM Low Cost

9860
9820
9840

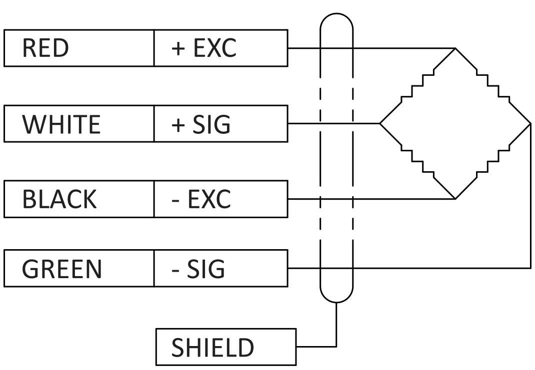
9320
9330

PC

Interface Graphing & Logging Software
65V-MULTI
9860
INF-U.S.B

U.S.er Supplies
Data Acquisition
Chart Recorder
PLC

Wiring DIAGRAM



ORDERING INFORMATION

LBMU - xxx - xxx

Factory assigned option codes for cU.S.tom / special configurations

Capacity Rating (lbf / kN)
[100, 250, 500, 1K] / [0.44, 1.11, 2.22, 4.45]

Model

LBS MINIATURE COMPRESSION LOAD BUTTON (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 5 to 1K lbf (0.02 to 4.45 kN)
- Temperature compensated
- Integral load button
- Small diameter
- From 0.12 inch (3 mm) height

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.50
Hysteresis – %FS		±0.50
Nonrepeatability – %RO		±0.10
TEMPERATURE		
Compensated Range	°F	+60 to +160
	°C	+15 to +71
Operating Range	°F	-65 to +250
	°C	-54 to +121
Effect on Zero – %RO / °F MAX		±0.005
Zero Balance – %FS		±2.0
ELECTRICAL		
Rated Output – mV/V (Nominal)		2.0
Bridge Resistance – Ohm (Nominal)		350
Excitation Voltage – VDC		5
Excitation Voltage – VDC MAX		7
MECHANICAL		
Calibration		Compression
Deflection		0.001 - 0.003
Safe Overload – %CAP		150
Ultimate Overload % of CAP		300
Weight	lbs	0.5
	kg	0.23
Material		Stainless steel

OPTIONS

- CU.S.tom calibration
- Add connector to cable
- Transducer Electronic Data Sheet (TEDS)

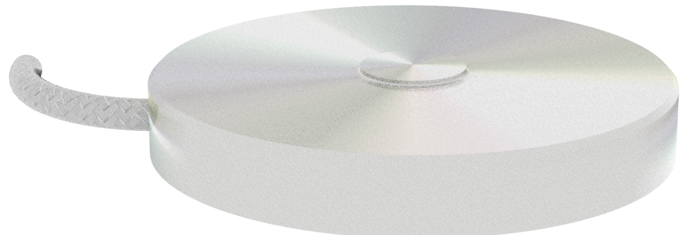
ACCESSORIES

- Instrumentation

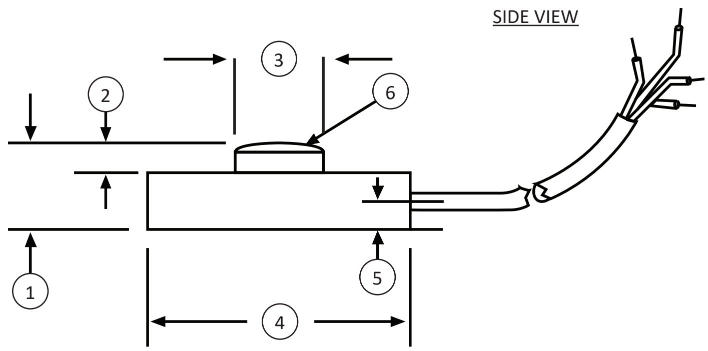
CONNECTOR OPTIONS

- 5 ft (1.5 m) integral cable

STANDARD CONFIGURATION



Model LBS (Shown)



Dimensions

See Drawing	CAPACITY					
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	5, 10, 25, 50	0.02, 0.04, 0.11, 0.22	100, 250	0.44, 1.11	500, 1K	2.22, 4.45
	in	mm	in	mm	in	mm
(1)	0.12	3.00	0.15	3.80	0.25	6.4
(2)	0.03	0.80	0.02	0.50	0.03	0.80
(3)	0.09	2.20	0.12	3.00	0.24	6.10
(4)	0.38	9.60	0.50	13.0	0.75	19.0
(5)	0.04	1.00	0.06	1.50	0.10	2.50
(6)	Spherical radiU.S.					

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

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FORCE MEASUREMENT SOLUTIONS.

LW LOAD WASHER (U.S. & METRIC)

FEATURES & BENEFITS

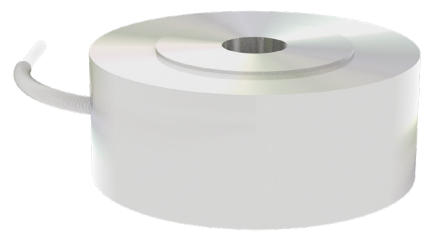
- Capacities from 5 to 100k lbf (0.02 to 44.5 kN)
- Wide selection of OD, ID, and height (as low as 0.25 in or 6.4 mm) combinations
- Stainless steel construction

Specifications

PARAMETERS		MODEL	
		LW10xx LW12xx	LW15xx LW20xx LW25xx LW30xx LW31xx LW40xx LW45xx
ACCURACY – (MAX ERROR)			
Combined Error – %FS		±1.0	±0.5
TEMPERATURE			
Compensated Range	°F	+60 to +160	
	°C	+16 to +71	
Operating Range	°F	-65 to +250	
	°C	-54 to +121	
Effect On Zero – %RO MAX	°F	±0.005	
	°C	±0.009	
ELECTRICAL			
Rated Output – mV/V (Nominal)		2.00	
Bridge Resistance – Ohm (Nominal)		350	
Excitation Voltage – VDC MAX		15	
MECHANICAL			
Safe Overload – % of RO		150	
Deflection @ R.O.	in	0.003	
	mm	0.08	
Material		Stainless steel	

Height is
- ***0.37 in. (9.4 mm) for 5.000 lbf (0.02 kN) thru 100.000 lbf (0.44 kN)***
- ***0.63 in. (16.0 mm) for 250.000 lbf (1.11 kN) thru 10k lbf (44.5 kN)***

STANDARD CONFIGURATION



Model LW (Shown)

OPTIONS

- Cable length
- Add connector to cable
- Transducer Electronic Data Sheet (TEDS)
- CU.S.tom calibration Accessories

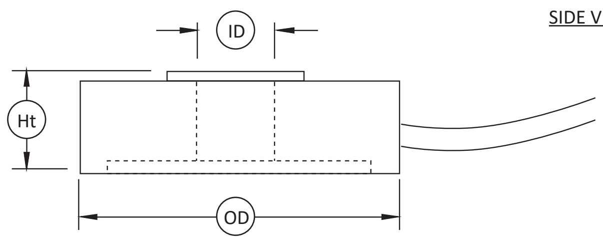
ACCESSORIES

- Instrumentation

CONNECTOR OPTIONS

- 5 ft (1.5 m) integral cable (LW)

SIDE VIEW



*****Height is***
- ***1.00 in. (25.4 mm) for 1k lbf (4.45 kN) thru 50k lbf (222 kN)***
- ***2.00 in. (50.8 mm) for 100k lbf (445 kN)***

Dimensions

MODEL LW	OD		ID		HEIGHT		CAPACITY	
	in	mm	in	mm	in	mm	U.S. (lbf)	Metric (kN)
1010	1.00	25.4	0.100	2.54	0.28	7.1	5, 10, 25, 50, 100, 200	0.02, 0.04, 0.11, 0.22, 0.44, 0.89
1012	1.00	25.4	0.125	3.18	0.28	7.1	5, 10, 25, 50, 100, 200	0.02, 0.04, 0.11, 0.22, 0.44, 0.89
1019	1.00	25.4	0.188	4.78	0.28	7.1	5, 10, 25, 50, 100, 200	0.02, 0.04, 0.11, 0.22, 0.44, 0.89
1020	1.00	25.4	0.200	5.08	0.28	7.1	5, 10, 25, 50, 100, 200	0.02, 0.04, 0.11, 0.22, 0.44, 0.89
1025	1.00	25.4	0.250	6.35	0.28	7.1	5, 10, 25, 50, 100, 200	0.02, 0.04, 0.11, 0.22, 0.44, 0.89
1210	1.25	31.75	0.100	2.54	0.25	6.35	25, 50, 100, 250, 500	0.11, 0.22, 0.44, 1.11, 2.22
1212	1.25	31.75	0.125	3.18	0.25	6.35	25, 50, 100, 250, 500	0.11, 0.22, 0.44, 1.11, 2.22
1219	1.25	31.75	0.188	4.78	0.25	6.35	25, 50, 100, 250, 500	0.11, 0.22, 0.44, 1.11, 2.22
1220	1.25	31.75	0.200	5.08	0.25	6.35	25, 50, 100, 250, 500	0.11, 0.22, 0.44, 1.11, 2.22
1225	1.25	31.75	0.250	6.35	0.25	6.35	25, 50, 100, 250, 500	0.11, 0.22, 0.44, 1.11, 2.22
1231	1.25	31.75	0.312	7.92	0.25	6.35	25, 50, 100, 250, 500	0.11, 0.22, 0.44, 1.11, 2.22
1238	1.25	31.75	0.375	9.53	0.25	6.35	25, 50, 100, 250, 500	0.11, 0.22, 0.44, 1.11, 2.22

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

LW LOAD WASHER (U.S. & METRIC)

DIMENSIONS (CONTINUED)

MODEL LW	OD		ID		HEIGHT		CAPACITY	
	in	mm	in	mm	in	mm	U.S. (lbf)	Metric (kN)
1510	1.50	38.1	0.100	2.54	0.50	12.7	100, 250, 500, 1K, 2K, 3K, 5K	0.44, 1.11, 2.22, 4.45, 8.90, 13.3, 22.2
1513	1.50	38.1	0.125	3.18	0.50	12.7	100, 250, 500, 1K, 2K, 3K, 5K	0.44, 1.11, 2.22, 4.45, 8.90, 13.3, 22.2
1520	1.50	38.1	0.200	5.08	0.50	12.7	100, 250, 500, 1K, 2K, 3K, 5K	0.44, 1.11, 2.22, 4.45, 8.90, 13.3, 22.2
1525	1.50	38.1	0.250	6.35	0.50	12.7	100, 250, 500, 1K, 2K, 3K, 5K	0.44, 1.11, 2.22, 4.45, 8.90, 13.3, 22.2
1531	1.50	38.1	0.312	7.92	0.50	12.7	100, 250, 500, 1K, 2K, 3K, 5K	0.44, 1.11, 2.22, 4.45, 8.90, 13.3, 22.2
1538	1.50	38.1	0.375	9.53	0.50	12.7	100, 250, 500, 1K, 2K, 3K, 5K	0.44, 1.11, 2.22, 4.45, 8.90, 13.3, 22.2
1550	1.50	38.1	0.500	12.70	0.50	12.7	100, 250, 500, 1K, 2K, 3K, 5K	0.44, 1.11, 2.22, 4.45, 8.90, 13.3, 22.2
2013	2.00	50.8	0.125	3.18	*		5, 10, 25, 50, 250, 500, 1K	0.02, 0.04, 0.11, 0.22, 1.11, 2.22, 4.45
2019	2.00	50.8	0.188	4.78	*		5, 10, 25, 50, 250, 500, 1K, 2K	0.02, 0.04, 0.11, 0.22, 1.11, 2.22, 4.45, 8.90
2025	2.00	50.8	0.250	6.35	*		5, 10, 25, 50, 250, 500, 1K, 2K, 3K, 5K	0.02, 0.04, 0.11, 0.22, 1.11, 2.22, 4.45, 8.90, 13.3, 22.2
2038	2.00	50.8	0.375	9.53	*		5, 10, 25, 50, 250, 500, 1K, 2K, 3K, 5K, 7.5K, 10K	0.02, 0.04, 0.11, 0.22, 1.11, 2.22, 4.45, 8.90, 13.3, 22.2, 33.4, 44.5
2050	2.00	50.8	0.500	12.70	*		5, 10, 25, 50, 250, 500, 1K, 2K, 3K, 5K, 7.5K, 10K	0.02, 0.04, 0.11, 0.22, 1.11, 2.22, 4.45, 8.90, 13.34, 22.2, 33.4, 44.5
2063	2.00	50.8	0.625	15.88	*		5, 10, 25, 50, 250, 500, 1K, 2K, 3K, 5K	0.02, 0.04, 0.11, 0.22, 1.11, 2.22, 4.45, 8.90, 13.3, 22.2
2075	2.00	50.8	0.750	19.05	*		250, 500, 1K, 2K, 3K, 5K	1.11, 2.22, 4.45, 8.90, 22.2
2088	2.00	50.8	0.875	22.23	*		250, 500, 1K, 2K, 3K	1.11, 2.22, 4.45, 8.90, 13.3
20100	2.00	50.8	1.000	25.40	*		500, 1K, 2K	2.22, 4.45, 8.90
2525	2.50	63.5	0.250	6.35	1.00	25.4	1K, 2K, 3K	4.45, 8.90, 13.3
2538	2.50	63.5	0.375	9.53	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5
2550	2.50	63.5	0.500	12.70	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K, 15K, 20K, 30K, 40K, 50K, 75K, 100K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5, 66.7, 89, 133, 178, 222, 334, 445
2563	2.50	63.5	0.625	15.88	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K, 15K, 20K, 30K, 40K, 50K, 75K, 100K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5, 66.7, 89, 133, 178, 222, 334, 445
2575	2.50	63.5	0.750	19.05	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K, 15K, 20K, 30K, 40K, 50K, 75K, 100K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5, 66.7, 89, 133, 178, 222, 334, 445
2588	2.50	63.5	0.875	22.23	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K, 15K, 20K, 30K, 40K, 50K, 75K, 100K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5, 66.7, 89, 133, 178, 222, 334, 445
2594	2.50	63.5	0.938	23.83	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K, 15K, 20K, 30K, 40K, 50K, 75K, 100K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5, 66.7, 89, 133, 178, 222, 334, 445
25100	2.50	63.5	1.000	25.40	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K, 15K, 20K, 30K, 40K, 50K, 75K, 100K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5, 66.7, 89, 133, 178, 222, 334, 445
25113	2.50	63.5	1.130	28.70	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5
25125	2.50	63.5	1.250	31.75	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5
25138	2.50	63.5	1.380	35.05	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5
25150	2.50	63.5	1.500	38.10	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5
3025	3.00	76.2	0.250	6.35	1.00	25.4	1K, 2K, 3K	4.45, 8.90, 13.3
3038	3.00	76.2	0.375	9.53	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5
3050	3.00	76.2	0.500	12.70	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K, 15K, 20K, 30K, 40K, 50K, 75K, 100K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5, 66.7, 89, 133, 178, 222, 334, 445
3063	3.00	76.2	0.625	15.88	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K, 15K, 20K, 30K, 40K, 50K, 75K, 100K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5, 66.7, 89, 133, 178, 222, 334, 445
3075	3.00	76.2	0.750	19.05	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K, 15K, 20K, 30K, 40K, 50K, 75K, 100K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5, 66.7, 89, 133, 178, 222, 334, 445
3088	3.00	76.2	0.875	22.23	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K, 15K, 20K, 30K, 40K, 50K, 75K, 100K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5, 66.7, 89, 133, 178, 222, 334, 445
3094	3.00	76.2	0.938	23.83	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K, 15K, 20K, 30K, 40K, 50K, 75K, 100K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5, 66.7, 89, 133, 178, 222, 334, 445

LW LOAD WASHER (U.S. & METRIC)

DIMENSIONS (CONTINUED)

MODEL LW	OD		ID		HEIGHT		CAPACITY	
	in	mm	in	mm	in	mm	U.S. (lbf)	Metric (kN)
30100	3.00	76.2	1.000	25.40	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K, 15K, 20K, 30K, 40K, 50K, 75K, 100K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5, 66.7, 89, 133, 178, 222, 334, 445
30113	3.00	76.2	1.130	28.70	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5
30125	3.00	76.2	1.250	31.75	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5
30138	3.00	76.2	1.380	35.05	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5
30150	3.00	76.2	1.500	38.10	1.00	25.4	1K, 2K, 3K, 5K, 7.5K, 10K	4.45, 8.90, 13.3, 22.2, 33.4, 44.5
31200	3.13	79.5	2.000	50.80	0.50	12.7	1K, 3K, 5K	4.45, 13.3, 22.2
31213	3.13	79.5	2.130	54.10	0.50	12.7	1K, 3K, 5K	4.45, 13.3, 22.2
40200	4.00	101.6	2.00	50.8	**		1K, 3K, 5K, 10K, 25K, 50K, 100K	4.45, 13.3, 22.2, 44.5, 111, 222, 445
40213	4.00	101.6	2.130	54.10	**		1K, 3K, 5K, 10K, 25K, 50K, 100K	4.45, 13.3, 22.2, 44.5, 111, 222, 445
45300	4.50	114.3	3.000	76.20	1.25	31.8	1K, 3K, 5K, 10K	4.45, 13.3, 22.2, 44.5
45313	4.50	114.3	3.130	79.50	1.25	31.8	1K, 3K, 5K, 10K	4.45, 13.3, 22.2, 44.5

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

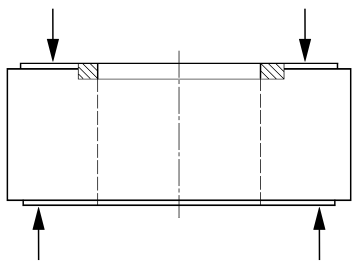
interface
FORCE MEASUREMENT SOLUTIONS.

LWCF CLAMPING FORCE LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 15 to 1500 kN (3.37K to 337K lbf)
- Ideal for determining bolt preload
- Low height and robU.S.t design

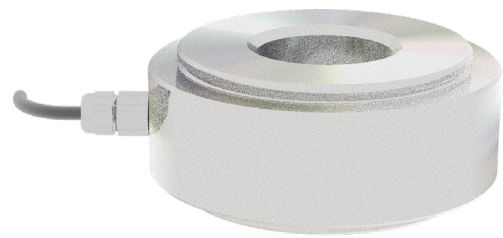
LOADING DIAGRAM



Specifications

ACCURACY - (MAX ERROR)		
Nonlinearity – %FS		±1
Nonrepeatability – %RO		±0.3
Creep, in 30 min – %		±0.1
TEMPERATURE		
Effect on Zero – %RO / °C		±0.03
Effect on Output – %RO / °C		±0.03
Compensated Range	°C	0 to +60
	°F	+32 to +140
Operating Range	°C	-10 to +70
	°F	+14 to +158
ELECTRICAL		
Output – mV/V ± %		1 ± 20
Excitation Voltage – VDC		2 - 6
Bridge Resistance – Ohm		250
MECHANICAL		
Safe Overload – %RO		150
Deflection at Rated Capacity	mm	< 0.1
	in	< 0.004
IP Rating		IP65
Material		Stainless steel

STANDARD CONFIGURATION



Model LWCF (Shown)

OPTIONS

- Special Temperature range
- Internal shunt resistor – 100% output
- Standardized output
- Cable length
- CU.S.tom calibration
- Add connector to cable
- Transducer Electronic Data Sheet (TEDS)

CONNECTOR OPTIONS

- 3 m (9.8 ft) integral cable

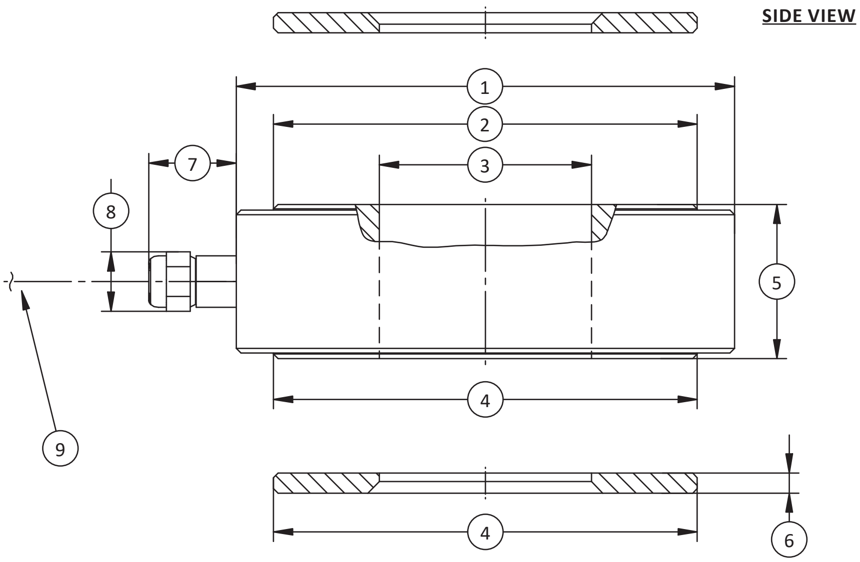
ACCESSORIES

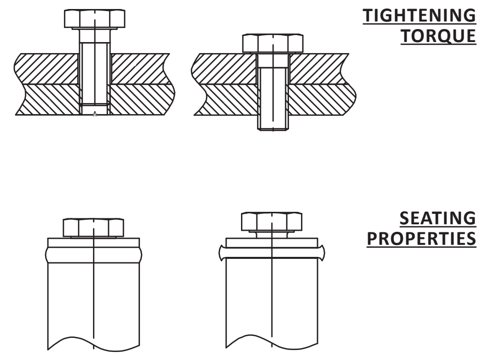
- Instrumentation

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

interface
FORCE MEASUREMENT SOLUTIONS.

LWCF CLAMPING FORCE LOAD CELL (U.S. & METRIC)





Dimensions

See Drawing	CAPACITY														
	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)
	15	**3.37K**	**30**	**6.74K**	**60**	**13.5K**	**80**	**18K**	**120**	**27K**	**160**	**36K**	**350**	**78.7K**
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
Screw	M6	1/4	M8	5/16	M10	7/16	M12	1/2	M16	5/8	M20	3/4	M24	1
(1)	Ø24	Ø0.9	Ø27	Ø1.1	Ø33	Ø1.3	Ø37	Ø1.5	Ø44	Ø1.7	Ø50	Ø2.0	Ø65	Ø2.6
(2)	Ø12	Ø0.5	Ø16	Ø0.6	Ø22	Ø0.9	Ø26	Ø1.0	Ø33	Ø1.3	Ø39	Ø1.5	Ø54	Ø2.1
(3)	Ø6.3	Ø0.25	Ø8.3	Ø0.3	Ø10.3	Ø0.41	Ø12.3	Ø0.48	Ø16.3	Ø0.64	Ø20.3	Ø0.80	Ø24.5	Ø0.96
(4)	Ø12	Ø0.5	Ø16	Ø0.6	Ø22	Ø0.9	Ø26	Ø1.0	Ø33	Ø1.3	Ø39	Ø1.5	Ø54	Ø2.1
(5)	12	0.5	12	0.5	12	0.5	15	0.6	15	0.6	15	0.6	22	0.9
(6)	2	0.08	2	0.08	2	0.08	2.5	0.1	2.5	0.1	3	0.1	3	0.1
(7)	15	0.6	15	0.6	15	0.6	15	0.6	15	0.6	15	0.6	15	0.6
(8)	Ø10	Ø0.4	Ø10	Ø0.4	Ø10	Ø0.4	Ø10	Ø0.4	Ø10	Ø0.4	Ø10	Ø0.4	Ø10	Ø0.4
(9)	Ø3.2	Ø0.13	Ø3.2	Ø0.13	Ø3.2	Ø0.13	Ø3.2	Ø0.13	Ø3.2	Ø0.13	Ø3.2	Ø0.13	Ø3.2	Ø0.13

See Drawing	CAPACITY											
	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)
	500	**112K**	**600**	**135K**	**720**	**162K**	**1K**	**225K**	**1.2K**	**270K**	**1.5K**	**337K**
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
Screw	M30	1 1/4	M36	1 1/2	M39	1 1/2	M42	1 3/4	M48	2	M52	2
(1)	Ø79	Ø3.1	Ø87	Ø3.4	Ø93	Ø3.7	Ø106	Ø4.2	Ø116	Ø4.6	Ø127	Ø5.0
(2)	Ø66	Ø2.6	Ø74	Ø2.9	Ø80	Ø3.1	Ø93	Ø3.7	Ø103	Ø4.1	Ø114	Ø4.5
(3)	Ø30.8	Ø1.2	Ø37	Ø1.5	Ø40	Ø1.6	Ø43	Ø1.7	Ø49	Ø1.9	Ø53.5	Ø2.1
(4)	Ø66	Ø2.6	Ø74	Ø2.9	Ø80	Ø3.1	Ø93	Ø3.7	Ø103	Ø4.1	Ø114	Ø4.5
(5)	27	1.1	27	1.1	27	1.1	30	1.2	30	1.2	35	1.4
(6)	3	0.1	3.5	0.1	4	0.2	4	0.2	4.5	0.2	4.5	0.2
(7)	15	0.6	15	0.6	15	0.6	15	0.6	15	0.6	15	0.6
(8)	Ø10	Ø0.4	Ø10	Ø0.4	Ø10	Ø0.4	Ø10	Ø0.4	Ø10	Ø0.4	Ø10	Ø0.4
(9)	Ø3.2	Ø0.13	Ø3.2	Ø0.13	Ø3.2	Ø0.13	Ø3.2	Ø0.13	Ø3.2	Ø0.13	Ø3.2	Ø0.13

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

LWHP14 LOAD WASHER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 0.05 to 100 kN (11.2 to 22.5K lbf)
- Ideal for applications requiring a thru-hole

OPTIONS

- Cable length
- Standardized output
- Add connector to cable
- CU.S.tom calibration
- Special Temperature range
- 100% control signal (internal shunt calibration)
- Transducer Electronic Data Sheet (TEDS)

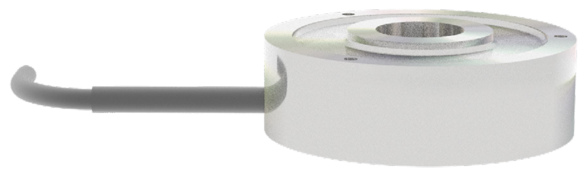
CONNECTOR OPTIONS

- 3 m (10 ft) integral cable

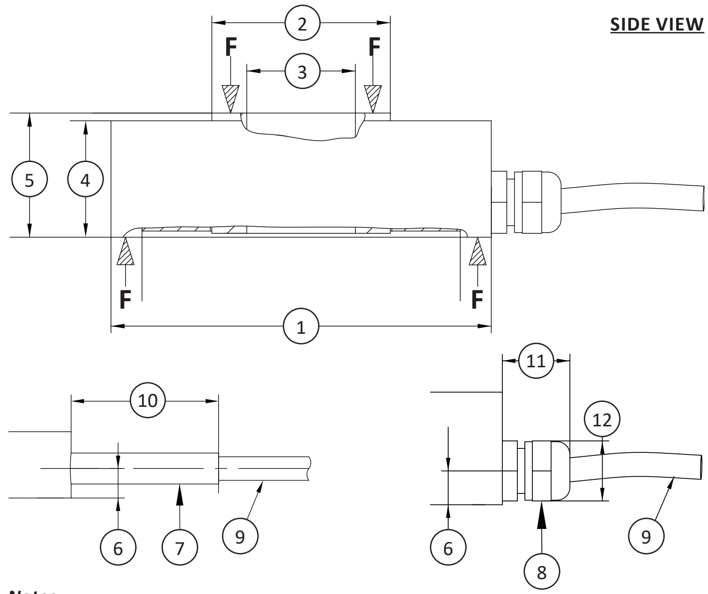
ACCESSORIES

- Instrumentation

STANDARD CONFIGURATION



Model LWHP14 (Shown)



Notes:
**** F indicates load direction***

Dimensions

See Drawing	CAPACITY							
	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)
	0.05, 0.1, 0.2, 0.5	**11.2, 22.5, 45, 112**	**1, 2, 5, 10**	**225, 450, 1.12K, 2.25K**	**20, 50**	**4.5 K, 11.2K**	**100**	**22.5K**
	mm	in	mm	in	mm	in	mm	in
1	Ø30	Ø1.2	Ø38	Ø1.5	Ø49	Ø1.9	Ø78	Ø3.1
2	Ø9.0	Ø0.35	Ø13.5	Ø0.53	Ø23	Ø0.9	Ø42	Ø1.7
3	Ø5.2	Ø0.20	Ø7	Ø0.3	Ø14	Ø0.6	Ø27	Ø1.1
4	8	0.3	9	0.4	15	0.6	24	0.9
5	9.5	0.37	10	0.4	16	0.6	25	1.0
6	4.5	0.18	4.0	0.16	4.5	0.18	7.5	0.30
7	X	X	X	X				
8					X	X	X	X
9	Ø3.2	Ø0.13	Ø3.2	Ø0.13	Ø3.2	Ø0.13	Ø3.2	Ø0.13
10	22	0.9	22	0.9	22	0.9	22	0.9
11	9	0.4	9	0.4	9	0.4	9	0.4
12	Ø10	Ø0.4	Ø10	Ø0.4	Ø10	Ø0.4	Ø10	Ø0.4

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

INTERFACE
FORCE MEASUREMENT SOLUTIONS

LWHP14 LOAD WASHER (U.S. & METRIC)

Specifications

CAPACITY		Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)
		0.05, 0.1, 0.2, 0.5	11.2, 22.5, 45, 112	1, 2, 5, 10	225, 450, 1.12K, 2.25K	20, 50	4.5K, 11.2K	100	22.5K
ACCURACY – (MAX ERROR)									
Nonlinearity – %FS		±0.5							
Hysteresis – %FS		±0.5							
Nonrepeatability – %RO		±0.2							
Creep, in 30 min – %		±0.1							
TEMPERATURE									
Effect on Zero – %RO / °C		±0.02							
Effect on Output – %RO / °C		±0.02							
Compensated Range	°C	0 to +60							
	°F	+32 to +140							
Operating Range	°C	-10 to +70							
	°F	+14 to +158							
ELECTRICAL									
Output – mV/V ± %		1 ± 20							
Excitation Voltage – VDC		2 - 12							
Bridge Resistance – Ohm		350							
MECHANICAL									
Safe Overload – %RO		150							
Deflection at Rated Capacity	mm	< 0.15							
	in	< 0.006							
IP Rating		IP60							
Weight	kg	0.2		0.2		0.3		0.8	
	lbs	0.44		0.44		0.66		1.76	
Material		Stainless steel							

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

FORCE MEASUREMENT SOLUTIONS.

LWHP18 COMPRESSION LOAD WASHER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 5 to 5,000kN (1.12K to 1124K lbf)
- IP67 environmental protection
- Stainless steel construction

Specifications

ACCURACY – (MAX ERROR)			
Capacities	Metric	5 to 200kN	500 to 5000kN
	U.S.	1.12K to 45K lbf	112K to 1.12K lbf
Nonlinearity – %FS		±0.5	
Hysteresis – %FS		±0.5	
Nonrepeatability – %RO		±0.1	
Creep, in 30 min – %		±0.1	
TEMPERATURE			
Effect on Zero – %RO / °C		±0.01	
Effect on Output – %RO / °C		±0.01	
Compensated Range	°C	-10 to +70	
	°F	+14 to +158	
Operating Range	°C	-30 to +80	
	°F	-22 to +176	
ELECTRICAL			
Output – mV/V		1 ±20%	
Excitation Voltage – VDC		2 - 12	
Bridge Resistance – Ohm		350	
Electrical Connection – Cable	m	3	Connector – Binder581
	ft	9.8	
MECHANICAL			
Safe Overload – %RO		150	
Deflection at Rated Capacity – mm		< 0.1	
IP Rating		IP67	
Material		Stainless steel	

OPTIONS

- Special Temperature range
- Internal shunt resistor – 100% output
- Standardized output
- Add connector to cable
- CU.S.tom calibration
- Transducer Electronic Data Sheet (TEDS)
- Cable length
- 100% control signal (internal shunt cal)

ACCESSORIES

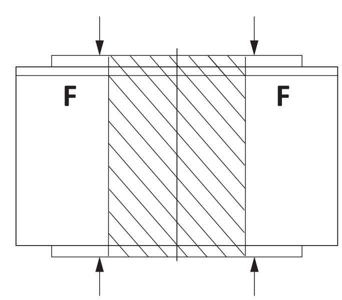
- Instrumentation

STANDARD CONFIGURATION

Model LWHP18 5 kN (Shown)

Model LWHP18 500 - 5000 kN (Shown)

LOADING DIAGRAM



CONNECTOR OPTIONS

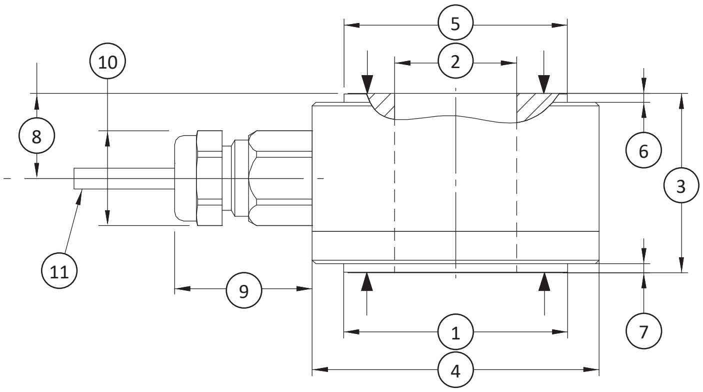
- 3 m (10 ft) integral cable
- Series 723 binder (5 to 5000 kN or
- 112 to 1124K lbf)

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

interface

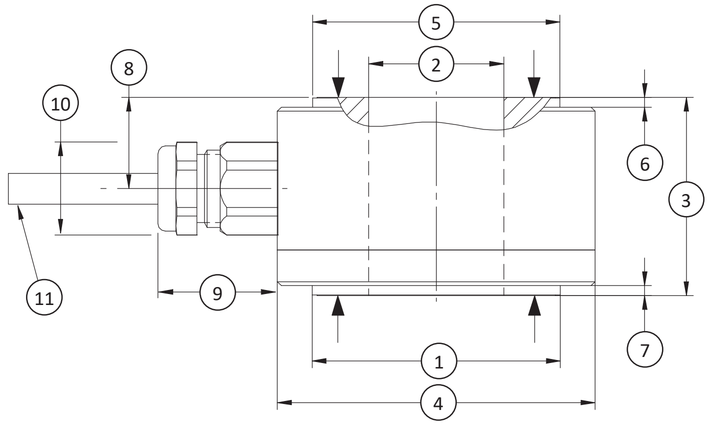
FORCE MEASUREMENT SOLUTIONS

LWHP18 COMPRESSION LOAD WASHER (U.S. & METRIC)



Dimensions

See Drawing	CAPACITY	
	Metric (kN)	U.S. (lbf)
	5	1.12K
	mm	in
(1)	Ø10	Ø0.4
(2)	Ø5	Ø0.2
(3)	30	1.2
(4)	Ø30	Ø1.2
(5)	Ø10	Ø0.4
(6)	2	0.1
(7)	2	0.1
(8)	15	0.6
(9)	14.5	0.57
(10)	Ø10	Ø0.394
(11)	Ø3.2	Ø0.13

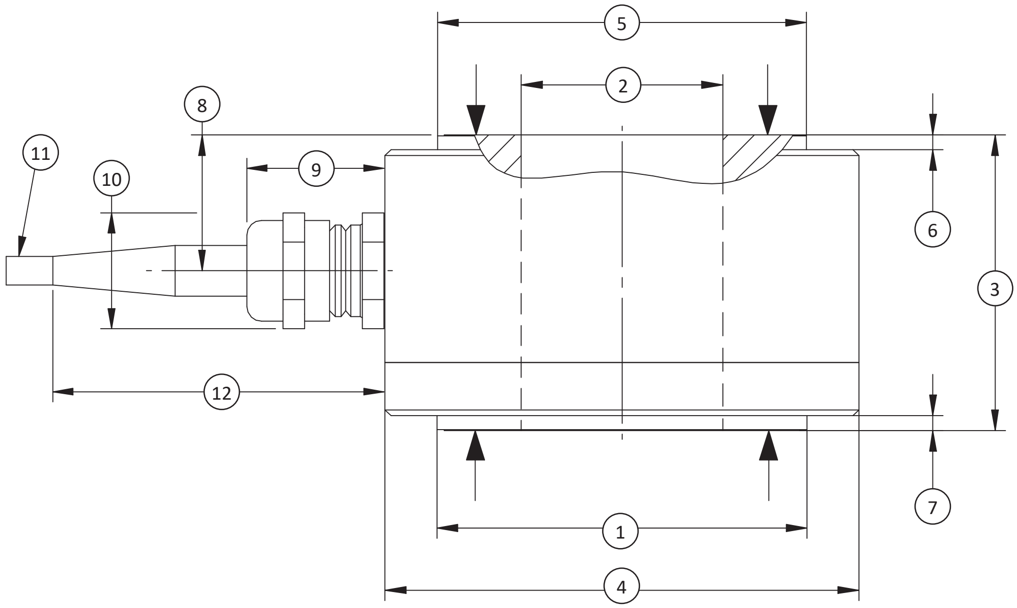


Dimensions

See Drawing	CAPACITY					
	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)
	10	2.25K	20	4.5K	50	11.2K
	mm	in	mm	in	mm	in
(1)	Ø14	Ø0.6	Ø22	Ø0.9	Ø28	Ø1.1
(2)	Ø8	Ø0.3	Ø15	Ø0.6	Ø15	Ø0.6
(3)	30	1.2	30	1.2	30	1.2
(4)	Ø30	Ø1.2	Ø40	Ø1.6	Ø40	Ø1.6
(5)	Ø14	Ø0.6	Ø22	Ø0.9	Ø28	Ø1.1
(6)	2	0.1	2	0.1	2	0.1
(7)	2	0.1	2	0.1	2	0.1
(8)	15	0.6	15	0.6	15	0.6
(9)	15.5	0.61	15.5	0.61	15.5	0.61
(10)	Ø12	Ø0.47	Ø12	Ø0.47	Ø12	Ø0.47
(11)	Ø4.6	Ø0.18	Ø4.6	Ø0.18	Ø4.6	Ø0.18

interface
FORCE MEASUREMENT SOLUTIONS.

LWHP18 COMPRESSION LOAD WASHER (U.S. & METRIC)

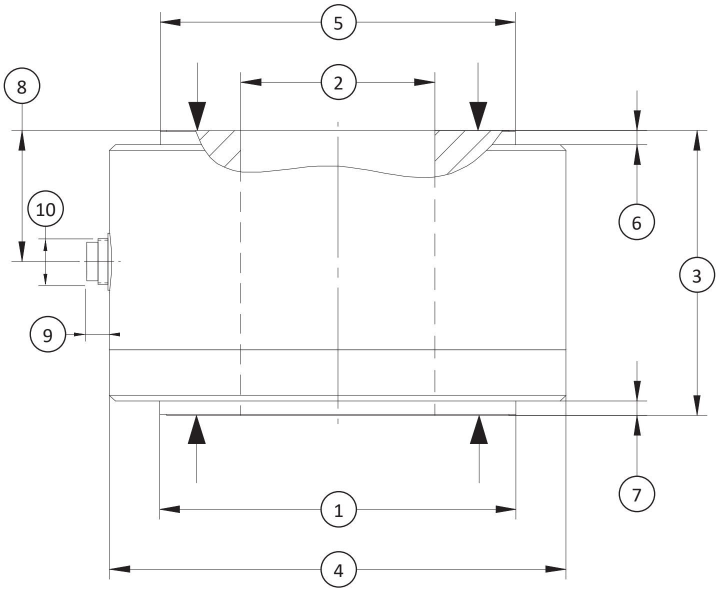


Dimensions

See Drawing	CAPACITY			
	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)
	100	22.5K	200	45K
	mm	in	mm	in
(1)	Ø35	Ø1.4	Ø47.5	Ø1.9
(2)	Ø20	Ø0.8	Ø25	Ø1.0
(3)	40	1.6	40	1.6
(4)	Ø55	Ø2.2	Ø64	Ø2.5
(5)	Ø35	Ø1.4	Ø48	Ø1.9
(6)	2	0.1	2.5	0.1
(7)	2	0.1	2.5	0.1
(8)	20	0.8	20	0.8
(9)	19	0.75	19	0.75
(10)	Ø16.5	Ø0.65	Ø16.5	Ø0.65
(11)	Ø4.6	Ø0.18	Ø4.6	Ø0.18
(12)	46	1.8	46	1.8

FORCE MEASUREMENT SOLUTIONS.

LWHP18 COMPRESSION LOAD WASHER (U.S. & METRIC)



Dimensions

See Drawing	CAPACITY									
	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)
	500	112K	1000	225K	2000	450K	3000	674K	5000	1124K
	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	Ø60	Ø2.4	Ø88	Ø3.5	Ø105.6	Ø4.2	Ø125	Ø4.9	Ø220	Ø8.7
(2)	Ø30	Ø1.2	Ø68	Ø2.8	Ø68	Ø2.8	Ø68	Ø2.8	Ø100	Ø3.9
(3)	50	20	100	3.9	100	3.9	100	3.9	120	4.7
(4)	Ø80	Ø3.1	Ø129	Ø5.1	Ø160	Ø6.3	Ø160	Ø6.3	Ø270	Ø10.6
(5)	Ø60	Ø2.4	Ø88	Ø3.5	Ø106	Ø4.2	Ø124.6	Ø4.9	Ø220	Ø8.7
(6)	4	0.2	4	0.2	5	0.2	5	0.2	5	0.2
(7)	3	0.1	5	0.2	5	0.2	5	0.2	5	0.2
(8)	26	1.0	46.5	1.8	46	1.8	47	1.9	60	2.4
(9)	Ø20	Ø0.79	Ø20	Ø0.79	Ø20	Ø0.79	Ø20	Ø0.79	Ø20	Ø0.79
(10)	12.5	0.49	12.5	0.49	12.5	0.49	12.5	0.49	12.5	0.49

FORCE MEASUREMENT SOLUTIONS.

LWMH1 THRU-HOLE LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 0.2 to 10 kN (45 to 2.25K lbf)
- Ideal for press force control and measurement
- Mounting holes for installation

Specifications

ACCURACY → (MAX ERROR)		
Nonlinearity – %FS		±1
Hysteresis – %FS		±1
Nonrepeatability – %RO		±0.3
Creep, in 30 mon – %		±0.1
TEMPERATURE		
Effect on Zero – %RO / °C		±0.02
Effect on Output – %RO / °C		±0.02
Compensated Range	°C	0 to +60
	°F	+32 to +140
Operating Range	°C	-10 to +70
	°F	+14 to +158
ELECTRICAL		
Output – mV/V ± %		1 ± 20
Excitation Voltage – VDC		2 - 12
Bridge Resistance – Ohm		350
MECHANICAL		
Safe Overload – %RO		150
Deflection at Rated Capacity	mm	< 0.15
	in	< 0.006
IP Rating		IP60
Material		Aluminum

OPTIONS

- Cable length
- CU.S.tom calibration
- Standardized output
- Add connector to cable
- Special Temperature range
- Internal shunt resistor – 100% output
- Tranducer Electronic Data Sheet (TEDS)

CONNECTOR OPTIONS

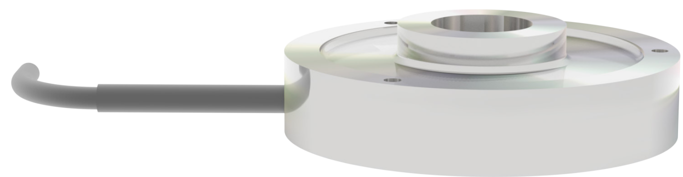
- 3 m (9.8 ft) integral cable

ACCESSORIES

- Instrumentation

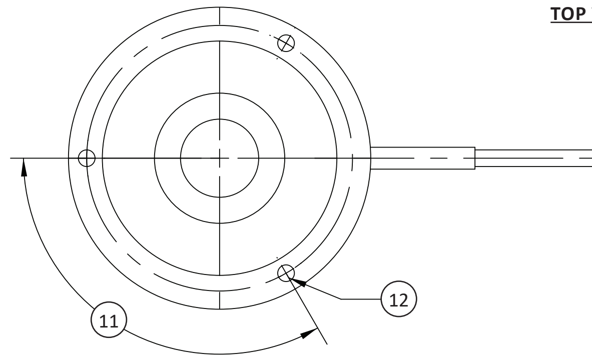
** F indicates load Direction*
U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

STANDARD CONFIGURATION

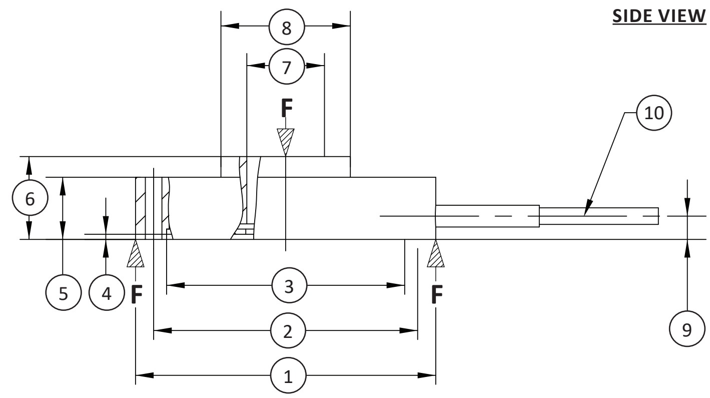


Model LWMH1 (Shown)

TOP VIEW



SIDE VIEW



Dimensions

See Drawing	CAPACITY	
	Metric (kN)	U.S. (lbf)
	0.2, 0.5, 1, 2, 5, 10	45, 112, 225, 450, 2.25K
	mm	in
(1)	Ø58 2.3	Ø2.3
(2)	Ø51 2.0	Ø2.0
(3)	Ø46 1.8	Ø1.8
(4)	1	Ø0.04
(5)	12	0.5
(6)	16	0.6
(7)	Ø15	Ø0.6
(8)	Ø25	Ø1.0
(9)	4.5	0.2
(10)	Ø3.2	Ø0.1
(11)	3 X 120°	
(12)	3 x Ø3.2	3 x Ø0.13

Catalog 2019 06-15-2020

LWMH2 THRU-HOLE LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 500 N to 20 kN (112.4 to 4.5K lbf)
- Ideal for press force control and measurement
- Mounting holes for installation

Specifications

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±1
Hysteresis – %FS		±1
Nonrepeatability – %RO		±0.3
Creep, in 30 min – %		±0.1
TEMPERATURE		
Effect on Zero – %RO / °C		±0.02
Effect on Output – %RO / °C		±0.02
Compensated Range	°C	0 to +60
	°F	+32 to +140
Operating Range	°C	-10 to +70
	°F	+14 to +158
ELECTRICAL		
Output – mV/V ± %		1 ± 20
Excitation Voltage – VDC		2 - 12
Bridge Resistance – Ohm		350
MECHANICAL		
Safe Overload – %RO		150
Deflection at Rated Capacity	mm	< 0.15
	in	< 0.006
IP Rating		IP60
Material		Aluminum

OPTIONS

- Cable length
- Add connector to cable
- CU.S.tom calibration
- Standardized output
- Special Temperature range
- Internal shunt resistor – 100% output
- Transducer Electronic Data Sheet (TEDS)

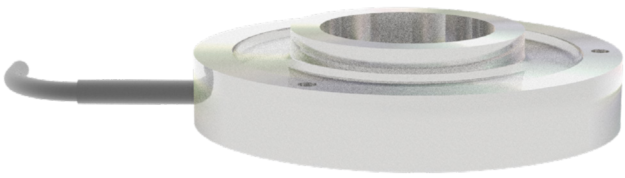
CONNECTOR OPTIONS

- 3 m (9.8 ft) integral cable

ACCESSORIES

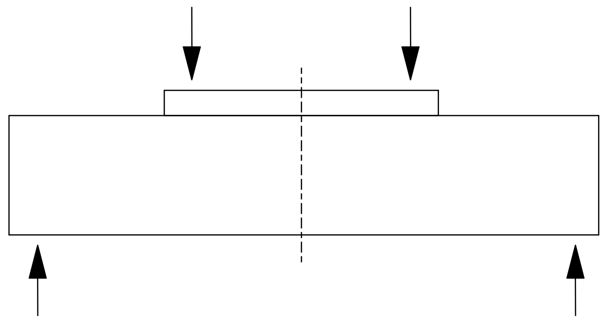
- Instrumentation

STANDARD CONFIGURATION



Model LWMH2 (Shown)

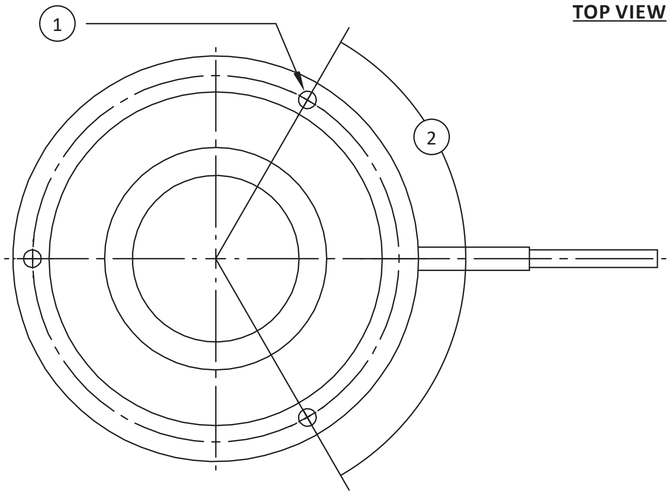
LOADING DIAGRAM



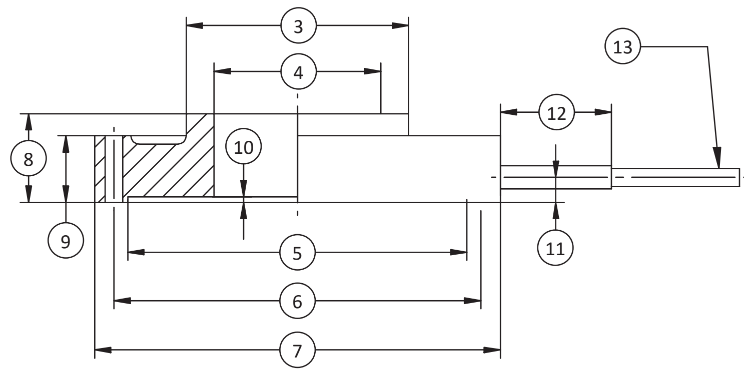
* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

LWMH2 THRU-HOLE LOAD CELL (U.S. & METRIC)

TOP VIEW



SIDE VIEW



Dimensions

See Drawing	Metric	U.S.
	500, 1K, 2K, 5K, 10K, 20K	112.4, 225, 450, 1.12K, 2.25K, 4.5K
	mm	in
(1)	3 x Ø3.2	
(2)	3 x 120°	
(3)	Ø40	Ø1.6
(4)	Ø30	Ø1.2
(5)	Ø61 (+0.3)	Ø2.4 (+0.01)
(6)	Ø66 (±0.1)	Ø2.6 (±0.004)
(7)	Ø73 (-0.2)	Ø2.9 (-0.008)
(8)	16	0.6
(9)	12	0.5
(10)	1	0.04
(11)	4.5	0.18
(12)	22	0.9
(13)	Ø3.2	Ø0.13

Catalog 2019 06-15-2020

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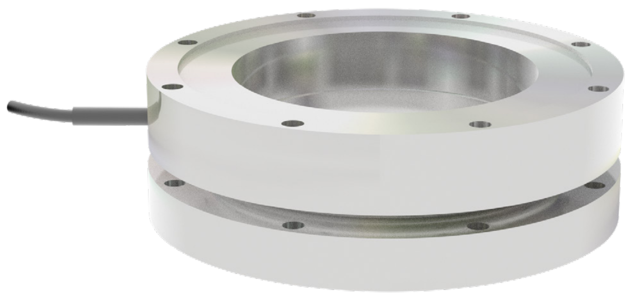
interface
FORCE MEASUREMENT SOLUTIONS.

LWPF1 PRESS FORCE LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 2 to 100 kN (450K to 22.5K lbf)
- Short height
- Large thru-hole
- For press-force monitoring

STANDARD CONFIGURATION

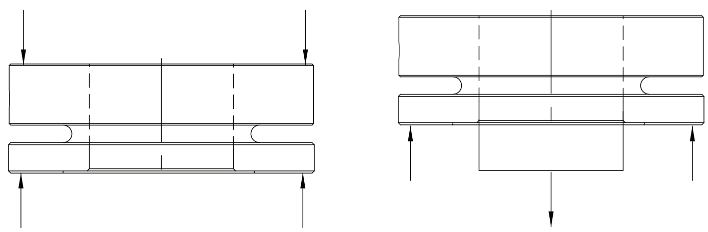


Model LWPF1 (Shown)

Specifications

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.5
Hysteresis – %FS		±0.5
Nonrepeatability – %RO		±0.1
Creep, in 30 min – %		±0.1
TEMPERATURE		
Effect on Zero – %RO / °C		±0.02
Effect on Output – %RO / °C		±0.02
Compensated Range	°C	0 to +60
	°F	+32 to +140
Operating Range	°C	-10 to +70
	°F	+14 to +158
ELECTRICAL		
Output – mV/V		1 ±20%
Excitation Voltage – VDC		2 - 12
Bridge Resistance – Ohm		700
Electrical Connection – Cable	m	3
	ft	10
MECHANICAL		
Safe Overload – %RO		150
Deflection at Rated Capacity	mm	< 0.15
	in	< 0.006
IP Rating		IP60
Material		Stainless steel / Aluminum

LOADING DIAGRAM



Compression Tension

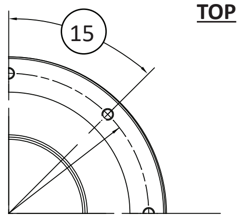
OPTIONS

- Extended Temperature range (-40 to +150°C or -40 to +302°F)
- Internal shunt resistor – 100% output

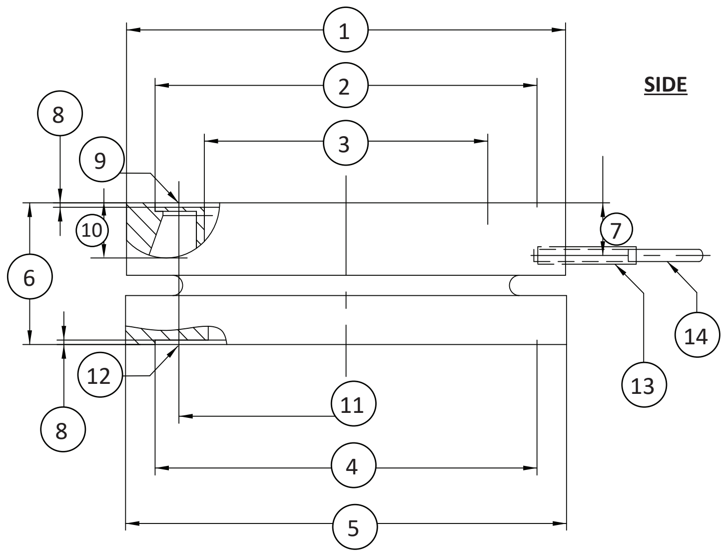
* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

LWPF1 PRESS FORCE LOAD CELL (U.S. & METRIC)

TOP



SIDE



Dimensions

See Drawing	CAPACITY			
	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)
	2, 5, 10, 20	450, 1.12K, 2.25K, 4.5K	50, 100	11.2K, 22.5K
	mm	in	mm	in
(1)	69.7	2.74	111.5	4.39
(2)	54	2.1	97	3.8
(3)	33	1.3	70	2.8
(4)	54	2.1	97	3.8
(5)	70g6	(2.7555/2.7548)	112g6	(4.4090/4.4081)
(6)	25	1.0	35	1.4
(7)	9	0.4	13	0.5
(8)	0.5	0.02	1.1	0.04
(9)	M5, 8 x 45°		M6, 8 x 45°	
(10)	5	0.2	6	0.2
(11)	62	2.4	104	4.1
(12)	M5, 8 X 45°		M6, 8 x 45°	
(13)	$18^{\pm3}$	$0.7^{\pm0.1}$	$18^{\pm3}$	$0.7^{\pm0.1}$
(14)	Ø3.2	Ø0.13	Ø3.2	Ø0.13
(15)	45°		45°	

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

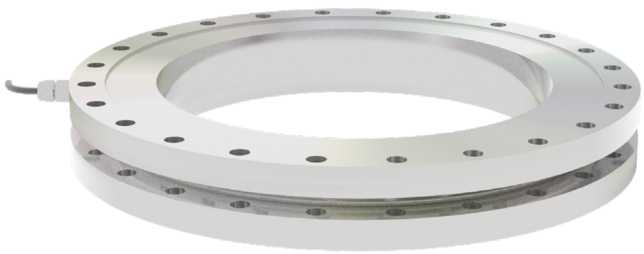
FORCE MEASUREMENT SOLUTIONS.

LWPF2 PRESS FORCE LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 100 kN to 600 kN
- Short height
- Large thru-hole
- For press-force monitoring

STANDARD CONFIGURATION

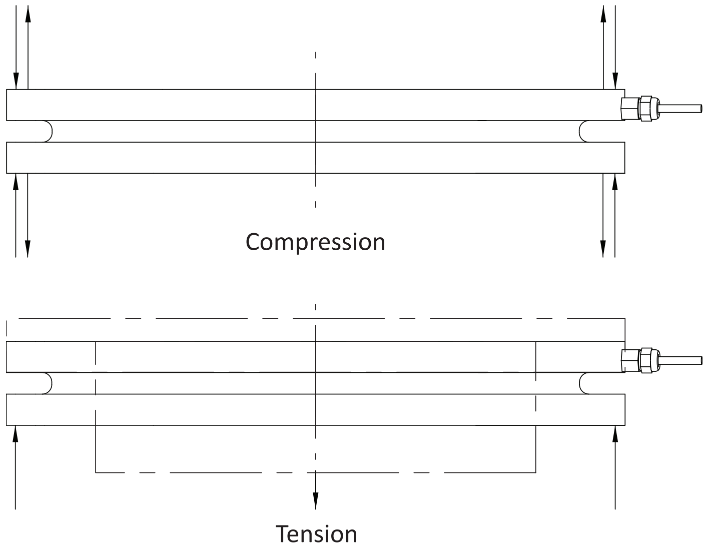


Model LWPF2 (shown)

Specifications

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.5
Hysteresis – %FS		±0.5
Nonrepeatability – %RO		±0.1
Creep, in 30 min – %		±0.1
TEMPERATURE		
Effect on Zero – %RO / °C		±0.02
Effect on Output – %RO / °C		±0.02
Compensated Range	°C	0 to +60
	°F	0 to +140
Operating Range	°C	-10 to +70
	°F	+14 to +158
ELECTRICAL		
Output – mV/V		1 ±20%
Excitation Voltage – VDC		2 - 12
Bridge Resistance – Ohm		700
Electrical Connection – Cable	m	3
	ft	10
MECHANICAL		
Safe Overload – %RO		150
Deflection at Rated Capacity	mm	< 0.15
	in	< 0.006
IP Rating		IP60
Material		Stainless steel / Aluminum

LOADING DIAGRAM

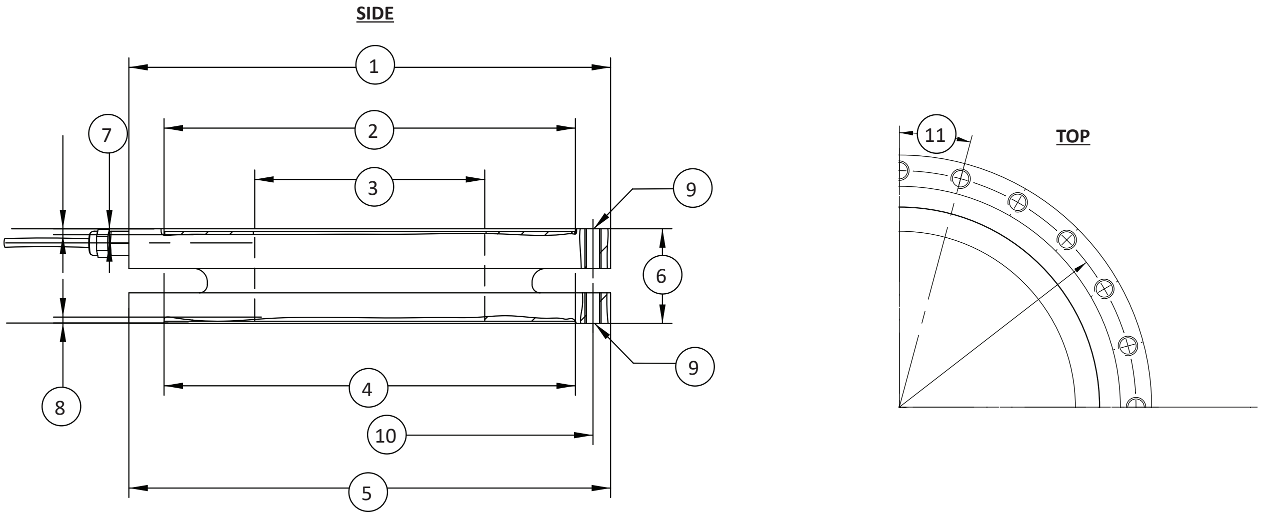


OPTIONS

- Extended Temperature range (-40 to +150°C or -40 to +302°F)
- Internal Shunt Resistor – 100% output

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

LWPF2 PRESS FORCE LOAD CELL (U.S. & METRIC)



Dimensions

See Drawing	CAPACITY									
	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)
	100	22.5K	200	45K	300	67.4K	400	90K	600	135K
	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	Ø178	Ø7.0	Ø196	Ø7.7	Ø258	Ø10.2	Ø258	Ø10.2	Ø320	Ø12.6
(2)	Ø152	Ø6.2	Ø170	Ø6.7	Ø226	Ø8.9	Ø226	Ø8.9	Ø266	Ø10.5
(3)	Ø85	Ø3.3	Ø120	Ø4.7	Ø180	Ø7.1	Ø170	Ø6.7	Ø205	Ø8.1
(4)	Ø152	Ø6.0	Ø170	Ø6.7	Ø226	Ø8.9	Ø226	Ø8.9	Ø266	Ø10.5
(5)	Ø178	Ø7.0	Ø196	Ø7.7	Ø258	Ø10.2	Ø258	Ø10.2	Ø320	Ø12.6
(6)	35	1.4	35	1.4	35	1.4	45	1.8	60	2.4
(7)	5.4	0.21	7	0.3	8	0.3	8	0.3	12.5	0.5
(8)	1	0.04	1	0.04	1	0.04	1	0.04	1	0.04
(9)	M6x24		M8x24		M10x24		M12x24		M16x24	
(10)	Ø165	Ø6.5	Ø182	Ø7.2	Ø242	Ø9.5	Ø242	Ø9.5	Ø290	Ø11.4

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

MB MINIATURE BEAM LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 5 to 250 lbf (22.2 to 1.11 kN)
- Proprietary Interface Temperature compensated strain gages
- Performance to 0.03%
- Low height – 1 in (25.4 mm)
- 0.0008%/°F temp. effect on output

STANDARD CONFIGURATION

Model MB (Shown)

OPTIONS

- Cable length
- Standardized output
- CU.S.tom calibration
- Add connector to cable
- Special Temperature range
- Transducer Electronic Data Sheet (TEDS)

CONNECTOR OPTIONS

- 5 ft (1.5 m) integral cable (MB)

ACCESSORIES

- Instrumentation

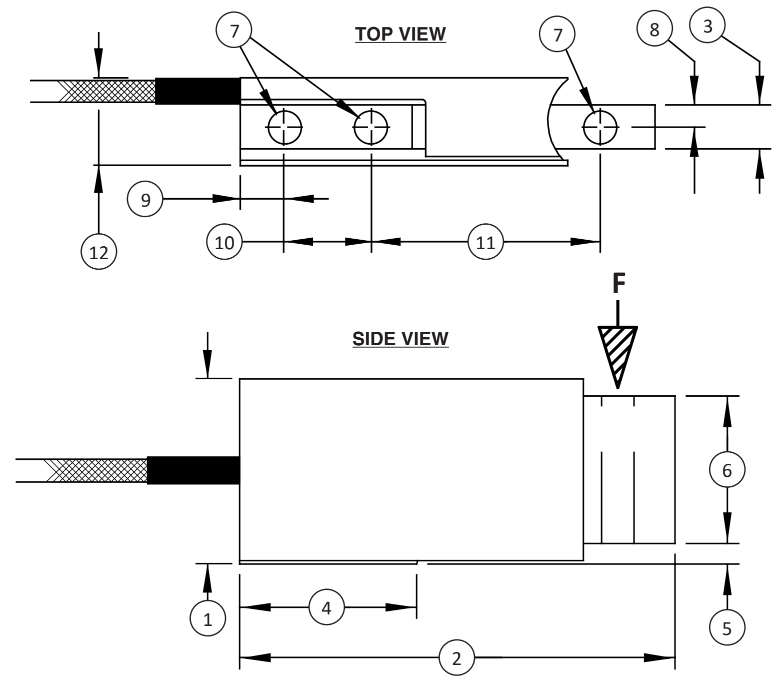
Specifications

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.03
Hysteresis – %FS		±0.02
Nonrepeatability – %RO		±0.01
Creep, in 20 min – %		±0.025
TEMPERATURE		
Compensated Range	°F	0 to +150
	°C	+32 to +65.56
Operating Range	°F	-65 to +200
	°C	-53.89 to + 93.33
Effect On Output – % / °F MAX		±0.0008
Effect On Zero – %RO / °F MAX		±0.0015
ELECTRICAL		
Rated Output – mV/V (Nominal)		3.0
Zero Balance – %RO		±1.0
Bridge Resistance – Ohm (Nominal)		350
Excitation Voltage – VDC MAX		15
Insulation Resistance – Megohm		5000
MECHANICAL		
Calibration		Compression
Safe Overload – %CAP		±150
Material		Aluminum

NATURAL FREQUENCY/DEFLECTION				
lbf	**N**	**Deflection (in)**	**Deflection (mm)**	**Nat. Freq. (Hz)**
5	22.2	0.005	0.127	950
10	44.5	0.005	0.127	1300
25	111	0.005	0.127	2250
50	222	0.004	0.102	3300
75	334	0.004	0.102	3900
100	445	0.005	0.127	4000
150	667	0.005	0.127	4750
250	1.11K	0.005	0.127	4400

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

MB MINIATURE BEAM LOAD CELL (U.S. & METRIC)



Dimensions

See Drawing	CAPACITY													
	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)
	5, 10	22.2, **44.5**	**25**	**111**	**50**	**222**	**75**	**334**	**100**	**445**	**150**	**667**	**250**	**1.11K**
	in	**mm**	**in**	**mm**	**in**	**mm**	**in**	**mm**	**in**	**mm**	**in**	**mm**	**in**	**mm**
(1)	1.01	25.7	1.01	25.7	1.01	25.7	1.01	25.7	1.01	25.7	1.01	25.7	1.02	25.9
(2)	2.38	60.5	2.38	60.5	2.38	60.5	2.38	60.5	2.38	60.5	2.38	60.5	2.38	60.5
(3)	0.25	6.4	0.25	6.4	0.25	6.4	0.25	6.4	0.25	6.4	0.25	6.4	0.5	12.8
(4)	0.97	24.6	0.97	24.6	0.97	24.6	0.97	24.6	0.97	24.6	0.97	24.6	0.97	24.6
(5)	0.14	3.6	0.11	2.8	0.15	3.8	0.14	3.6	0.13	3.3	0.1	2.5	0.12	3.0
(6)	0.75	19.1	0.81	20.6	0.72	18.3	0.75	19.1	0.78	19.8	0.82	20.8	0.79	20.1
(7)	0.17	4.3	0.17	4.3	0.17	4.3	0.17	4.3	0.17	4.3	0.17	4.3	0.17	4.3
(8)	0.13	3.3	0.13	3.3	0.13	3.3	0.13	3.3	0.13	3.3	0.13	3.3	0.25	6.4
(9)	0.25	6.4	0.25	6.4	0.25	6.4	0.25	6.4	0.25	6.4	0.25	6.4	0.25	6.4
(10)	0.50	12.7	0.50	12.7	0.50	12.7	0.50	12.7	0.50	12.7	0.50	12.7	0.50	12.7
(11)	1.31	33.3	1.31	33.3	1.31	33.3	1.31	33.3	1.31	33.3	1.31	33.3	1.31	33.3
(12)	0.50	12.7	0.50	12.7	0.50	12.7	0.50	12.7	0.50	12.7	0.50	12.7	0.75	19.1

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

FORCE MEASUREMENT SOLUTIONS

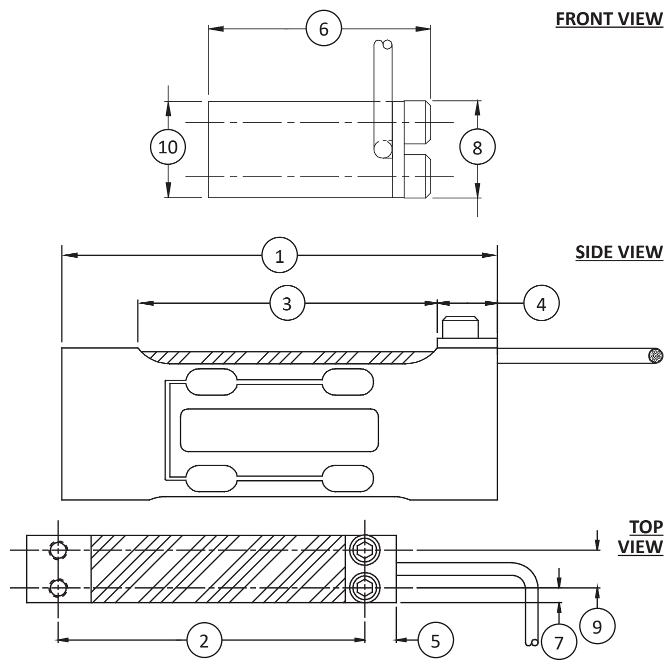
MBI FATIGUE RATED MINI BEAM OVERLOAD PROTECTED LOAD CELL (U.S. & Metric)

FEATURES & BENEFITS

- Capacities from 2 to 10 lbf (10 to 50 N)
- Proprietary Interface Temperature compensated strain gages
- Performance to 0.03%
- Low Height – 1 in (25.4 mm)
- 0.0008%/°F temp. effect on output
- 10x overload protection

STANDARD CONFIGURATION

Model MBI (Shown)



Specifications

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.03
Hysteresis – %FS		±0.03
Nonrepeatability – %RO		±0.01
Creep, in 20 min – %		±0.025
TEMPERATURE		
Compensated Range	°F	+70 to +170
	°C	+21 to +77
Operating Range	°F	-40 to +175
	°C	-40 to +80
Effect on Output – %RO / °F MAX		±0.0008
Effect on Zero – %RO / °F MAX		±0.002
ELECTRICAL		
Rated Output – mV/V (Nominal)		2
Zero Balance – %RO		±5.0
Bridge Resistance – Ohm (Nominal)		350
Excitation Voltage – VDC MAX		15
Insulation Resistance – Megohm		5000
MECHANICAL		
Calibration		Compression
Safe Overload – %CAP		1000
Eccentric Load Sensitivity	% / in	±0.02
	% / mm	±0.5
Weight (without the cable)	lbs	0.14
	kg	0.04
Material		Aluminum

Dimensions

See Drawing	CAPACITY	
	U.S. (lbf)	Metric (N)
	2, 5, 10	10, 20, 50
	in	mm
(1)	2.750	69.90
(2)	2.281	57.94
(3)	1.890	48.00
(4)	0.380	9.70
(5)	0.234	5.94
(6)	1.160	29.50
(7)	0.110	2.79
(8)	0.510	13.00
(9)	0.281	7.14
(10)	0.500	12.70

OPTIONS

- Cable length
- Standardized output
- CU.S.tom calibration
- Add connector to cable
- Special Temperature range
- Transducer Electronic Data Sheet (TEDS)

CONNECTOR OPTIONS

- 5 ft (1.5 m) integral cable (MBI)

ACCESSORIES

- Instrumentation

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

MBP MINIATURE BEAM OVERLOAD PROTECTED LOAD CELL (U.S. & Metric)

FEATURES & BENEFITS

- Capacities from 2.5 to 10 lbf (5 to 100 N)
- Proprietary Interface Temperature compensated strain gages
- 10X overload protection
- Low height – 1 in (25.4 mm)
- 0.0008% °F Temperature effect on output

Specifications

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.03
Hysteresis – %FS		±0.02
Nonrepeatability – %RO		±0.01
Creep, in 20 min – %		±0.025
TEMPERATURE		
Compensated Range	°F	0 to +150
	°C	+32 to +65.6
Operating Range	°F	-65 to +200
	°C	-53.9 to +93.3
Effect on Output – % / °F MAX		±0.0008
Effect on Zero – %RO / °F MAX		±0.0015
ELECTRICAL		
Rated Output – mV/V (Nominal)		3.0
Zero Balance – %RO		±1.0
Bridge Resistance – Ohm (Nominal)		350
Excitation Voltage – VDC MAX		15
Insulation Resistance – Megohm		5000
MECHANICAL		
Calibration		Compression
Safe Overload – %CAP	2.5-10 lbf	±1000
	10-50 N	
	100 N	±500
Deflection @RO	in	0.005
	mm	0.13
Material		Aluminum

OPTIONS

- Cable length
- Standardized output
- CU.S.tom calibration
- Add connector to cable
- Special Temperature range
- Transducer Electronic Datasheets (TEDS)

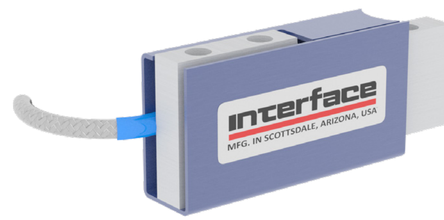
CONNECTOR OPTIONS

- 5 ft (1.5 m) integral cable (MBP)

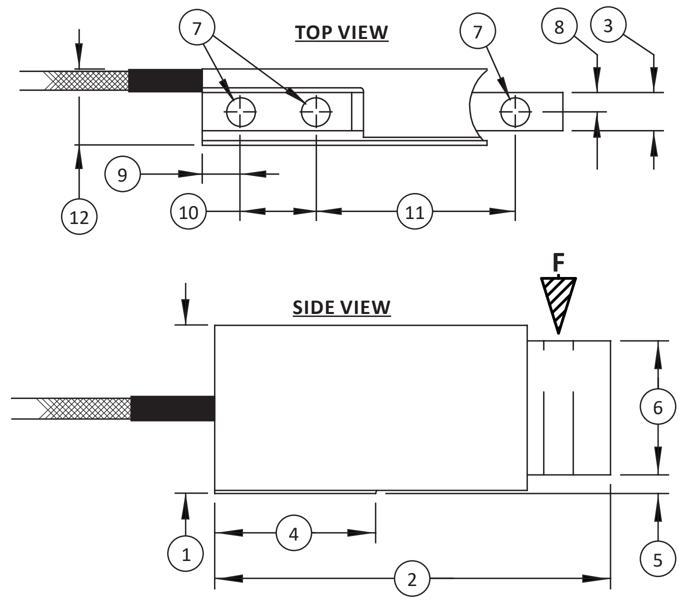
ACCESSORIES

- Instrumentation

STANDARD CONFIGURATION



Model MBP (Shown)



Notes:
F indicates load Direction
**** 5N Capacity: 1.50 (38.10)***

Dimensions

See Drawing	CAPACITY	
	U.S. (lbf)	**Metric (N)**
	2.5, 5, 10	***5, 10, 20, 50, 100**
	in	**mm**
(1)	1.01	25.7
(2)	2.38	60.5
(3)	0.25	6.4
(4)	0.97	24.6
(5)	0.14	3.6
(6)	0.75	19.1
(7)	0.17	4.3
(8)	0.13	3.3
(9)	0.25	6.4
(10)	0.50	12.7
(11)	1.31	*33.3
(12)	0.50	12.7

FORCE MEASUREMENT SOLUTIONS.

MSC SMALL DIAMETER HIGH CAPACITY LOAD BUTTON (U.S. & METRIC)

FEATURES & BENEFITS

- Proprietary Interface Temperature compensated strain gages
- Small compact design
- Environmentally sealed
- Low deflection

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		± 0.5
Hysteresis – %FS		± 0.5
Nonrepeatability – %RO		± 0.10
Creep, in 20 min – %		± 0.15
TEMPERATURE		
Compensated Range	°F	+40 to +140
	°C	+5 to +60
Operating Range	°F	-40 to +175
	°C	-40 to +80
Effect on Output – % MAX	°F	±0.2
	°C	±0.005
Effect on Zero – %RO MAX	°F	±0.5
	°C	±0.002
ELECTRICAL		
Rated Output – mV/V (Nominal) ± %		2 +40/-20
Zero Balance – %RO		±2
Bridge Resistance – Ohm (Nominal)		700
Excitation Voltage – VDC MAX		15
Insulation Resistance – Megohm		5000
MECHANICAL		
Calibration		Compression
Safe Overload – %CAP		150
Material		Stainless steel

OPTIONS

- Cable length
- CU.S.tom calibration
- Transducer Electronic Data Sheet (TEDS)
- Starndard output
- Add connector to cable
- Special Temperature range

CONNECTOR OPTIONS

- 5 ft (1.5 m) integral cable

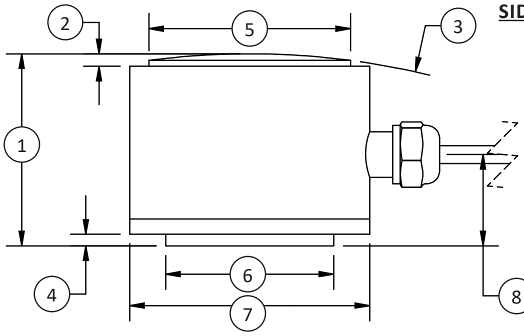
ACCESSORIES

- Instrumentation

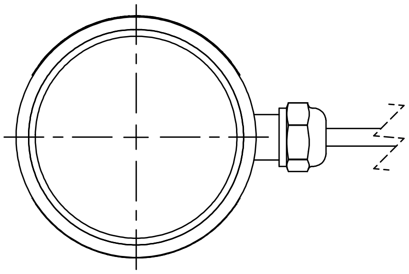
STANDARD CONFIGURATION

Model MSC (Shown)

SIDE VIEW



TOP VIEW



DIMENSIONS

See Drawing	CAPACITY	
	U.S. (lbf)	Metric (N)
	15K, 20K, 30K	65K, 90K, 130K
	in	mm
(1)	1.00	25.4
(2)	0.06	1.52
(3)	R 4.0 ±0.5	R 101.6 ±13
(4)	0.06	1.52
(5)	1.05	26.67
(6)	0.875	22.23
(7)	1.25	31.75
(8)	0.5 ±0.1	12.32

FORCE MEASUREMENT SOLUTIONS.

MTFS MINIATURE TENSION FORCE LOAD CELL (U.S. & METRIC)

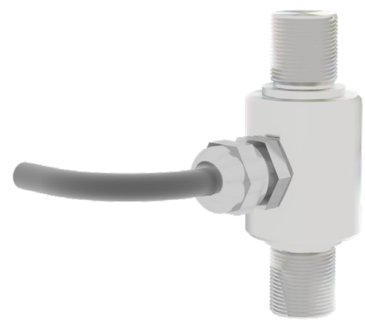
FEATURES & BENEFITS

- Capacities from 1 to 100 kN (0.22 to 22.5K lbf)
- Very small geometry
- IP65 environmental protection

Specifications

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.3
Hysteresis – %FS		±0.3
Nonrepeatability – %RO		±0.08
Creep, in 30 min – %		±0.1
TEMPERATURE		
Effect on Zero – %RO / °C		±0.02
Effect on Output – %RO / °C		±0.02
Compensated Range	°C	0 to +60
	°F	+32 to +140
Operating Range	°C	-10 to +70
	°F	+14 to +158
ELECTRICAL		
Output – mV/V / %		1 ± 20
Excitation Voltage – VDC	≤ 5 kN (≤ 1.12K lbf)	2 - 6
	> 5 kN (> 1.12K lbf)	2 - 12
Bridge Resistance – Ohm		350
MECHANICAL		
Safe Overload – %RO		150
Deflection at Rated Capacity	mm	< 0.1
	in	< 0.004
IP Rating		IP65
Material		Stainless steel flexure aluminum cover

STANDARD CONFIGURATION



Model MTFS 100-5kN (Shown)

OPTIONS

- Special Temperature range (selected capacities)
- Standardized output
- 100% control signal (internal shunt cal)
- Add connector to cable
- CU.S.tom calibration
- Cable length
- Transducer Electronic Data Sheet (TEDS)

CONNECTOR OPTIONS

- (3 m) 10 ft integral cable

ACCESSORIES

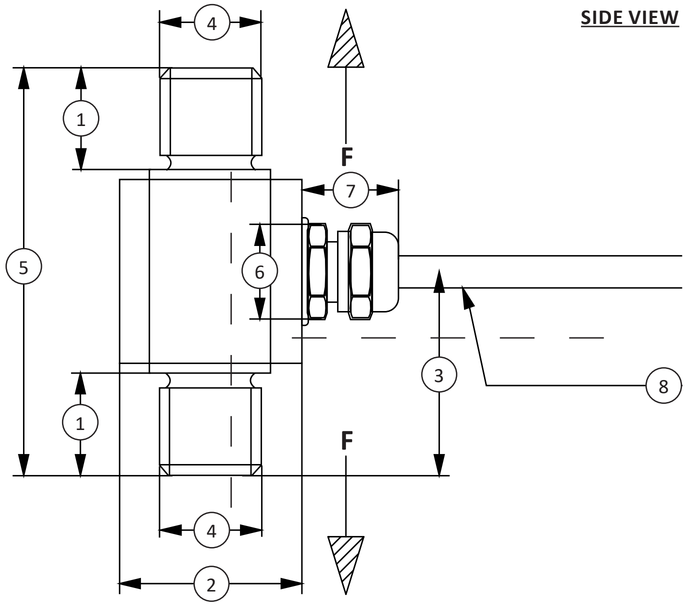
- Instrumentation

Catalog 2019 06-15-2020

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

MTFS MINIATURE TENSION FORCE LOAD CELL (U.S. & METRIC)

SIDE VIEW



Notes:
**** F indicates load direction***

Dimensions

See Drawing	CAPACITY											
	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)
	1	**225**	**5**	**1.12K**	**10**	**2.24K**	**20**	**4.49K**	**50**	**11.24K**	**100**	**22.48K**
	mm	**in**	**mm**	**in**	**mm**	**in**	**mm**	**in**	**mm**	**in**	**mm**	**in**
(1)	8	0.3	8	0.3	10	0.4	12	0.5	15	0.6	20	0.8
(2)	14	0.6	14	0.6	18	0.7	24	0.9	29	1.1	35	1.4
(3)	17.5	0.7	17.5	0.7	20	0.8	22.5	0.9	25	1.0	35	1.4
(4)	M5	M5	M8	M8	M10	M10	M12	M12	M16	M16	M24x2	M24x2
(5)	35	1.4	35	1.4	40	1.6	45	1.8	50	2.0	70	2.8
(6)	Ø10	Ø0.4	Ø10	Ø0.4	Ø10	Ø0.4	Ø10	Ø0.4	Ø10	Ø0.4	Ø10	Ø0.4
(7)	10	0.4	10	0.4	10	0.4	10	0.4	10	0.4	10	0.4
(8)	Ø3.2	Ø0.13	Ø3.2	Ø0.13	Ø3.2	Ø0.13	Ø3.2	Ø0.13	Ø3.2	Ø0.13	Ø3.2	Ø0.13

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

interface
FORCE MEASUREMENT SOLUTIONS.

REC ROD END LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 1K to 50K lbf (5 to 220 kN)
- Proprietary Interface Temperature compensated strain gages
- Stainless steel construction (1K lbf or 5 kN is aluminum)
- Low deflection

Specifications

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.25
Hysteresis – %FS		±0.15
Nonrepeatability – %FS		±0.05
TEMPERATURE		
Compensated Range	°F	+60 to +160
	°C	+15 to +72
Operating Range	°F	-60 to +200
	°C	-50 to +93
Effect on Output – %	°F	±0.005
	°C	±0.01
Effect on Zero – %RO	°F	±0.005
	°C	±0.01
ELECTRICAL		
Rated Output – mV/V (nominal)		2
Zero Balance – %RO		±3
Bridge Resistance – Ohm (nominal)		350
Excitation Voltage – VDC MAX		15
MECHANICAL		
Calibration		T & C
Safe Overload – %RO		150
Deflection	in	0.001
	mm	0.025
Material		Stainless steel (1K lbf or 5 kN aluminum)

STANDARD CONFIGURATION

Model REC-5K (Shown)

OPTIONS

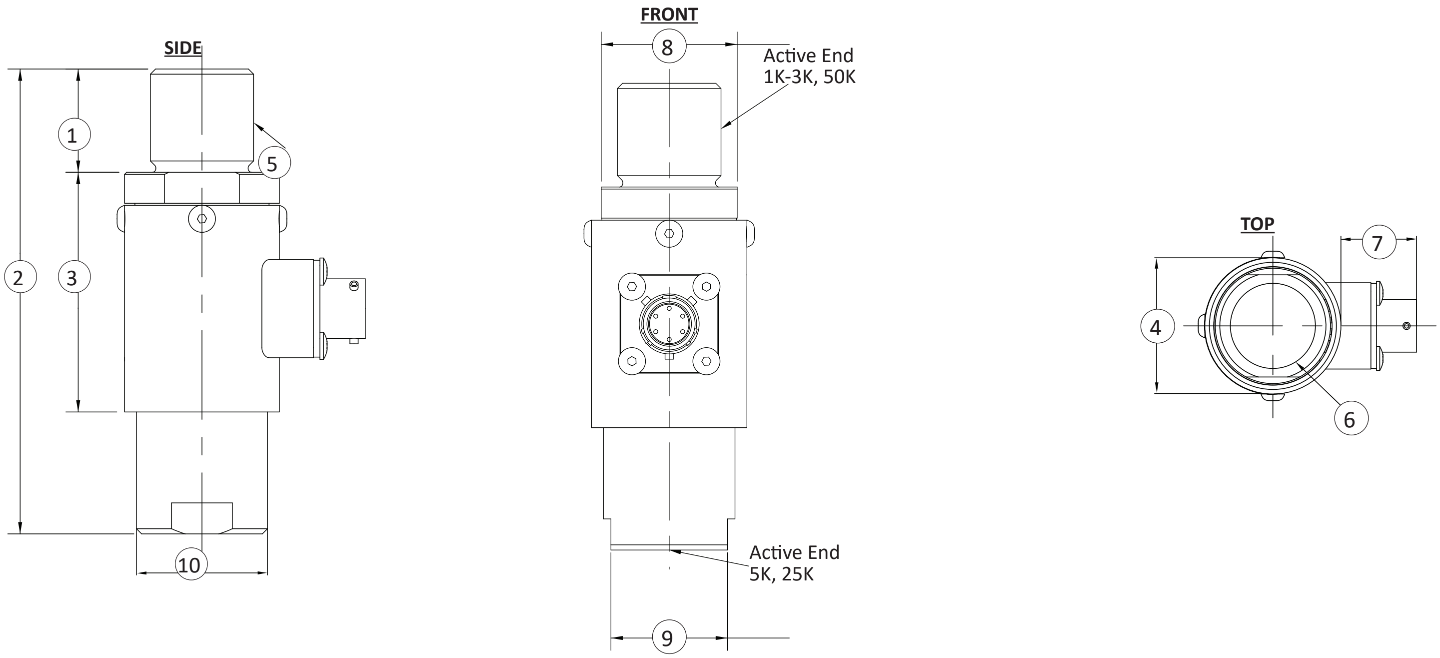
- 5K-50K: MS3102E-14-5P connector optional
- Standardized output
- Special Temperature range
- CU.S.tom calibration
- Transducer Electronic Data Sheet (TEDS)
- Standardized output

ACCESSORIES

- Instrumentation
- Mating connector

interface
FORCE MEASUREMENT SOLUTIONS.

REC ROD END LOAD CELL (U.S. & METRIC)



Dimensions

See Drawing	CAPACITY							
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	1K, 2K, 3K	5, 10, 13	5K, 10K	22, 45	15K, 20K 25K	67, 90, 110	50K	220
	in	mm	in	mm	in	mm	in	mm
(1)	1.00	25.4	1.00	25.4	1.00	25.4	1.50	38.1
(2)	4.25	108	4.50	114.3	4.50	114.3	7.00	177.8
(3)	N/A	N/A	2.32	58.9	2.32	58.9	N/A	N/A
(4)	N/A	N/A	Ø1.50	Ø38.1	Ø1.73	Ø43.9	N/A	N/A
(5)	¾-16 UNF-3A		1-14 UNS-2A		1-14 UNS-2A		1½-12 UNF-2A	
(6)	¾-16 UNF-2B		1-14 UNS-2B		1-14 UNS-2B		1½-12 UNF-2B	
	↧0.88	↧22.4	↧1.0	↧25.4	↧1.0	↧25.4	↧1.5	↧38.1
(7)	0.83	21.1	0.83	21.1	0.85	21.6	0.71	18
(8)	1.13	28.7	1.31	33.3	1.50	38.1	1.75	44.5
	Wrench Flats							
(9)	1.31	33.3	1.13	28.7	1.31	33.3	2.25	57.2
	Wrench Flats							
(10)	Ø1.50	Ø38.1	Ø1.27	Ø32.3	Ø1.50	Ø38.1	Ø2.50	Ø63.5

SM S-TYPE LOAD CELL (U.S. & METRIC)

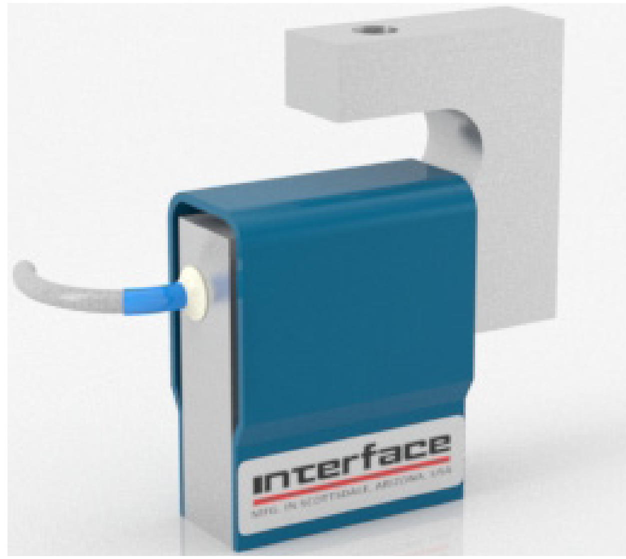
FEATURES & BENEFITS

- Proprietary Interface Temperature compensated strain gages
- High performance
- 0.0008%/°F (0.0015%/°C) temp. effect on output
- Lowest creep – 0.025%
- Tension and compression

SPECIFICATIONS

ACCURACY - (MAX ERROR)				
Nonlinearity – %FS				±0.03
Hysteresis – %FS				±0.02
Nonrepeatability – %RO				±0.01
Creep, in 20 min – %				±0.025
TEMPERATURE				
Compensated Range			°F	0 to +150
			°C	-15 to +65
Operating Range			°F	-65 to +200
			°C	-55 to +90
Effect on Output – % MAX			°F	±0.0008
			°C	±0.0015
Effect on Zero – %RO / °C MAX			°F	±0.0015
			°C	±0.0027
ELECTRICAL				
Rated Output – mV/V (Nominal)				3.0
Zero Balance – %RO				±1.0
Bridge Resistance – Ohm (Nominal)				350
Excitation Voltage – VDC MAX				15
Insulation Resistance – Megohm				> 5000
MECHANICAL				
Calibration				Tension
Safe torsion – %CAP				±150
NATURAL FREQUENCY/DEFLECTION				
lbf	N	Deflection		Natural Frequency (Hertz)
		in	mm	
10	50	0.003	0.08	600
25	100	0.003	0.08	1000
50	200	0.003	0.08	1550
100	500	0.004	0.1	1850
250	1000	0.006	0.15	2350
500	2000	0.006	0.15	2150
1000	5000	0.005	0.13	3350
Material				Aluminum

STANDARD CONFIGURATION



Model SM (shown)

OPTIONS

- Cable length
- Standardized output
- CU.S.tom calibration
- Transducer Electronic Data Sheets (TEDS)
- Add connector to cable
- Special temp range

ACCESSORIES

- Load button
- Mounting hardware
- Instrumentation

CONNECTOR OPTIONS

- 5 ft (1.5 m) integral cable

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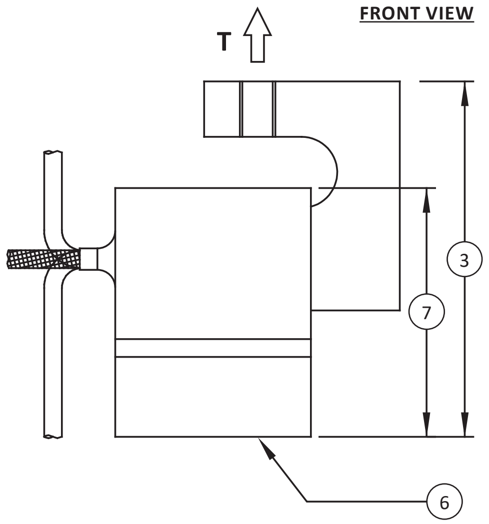
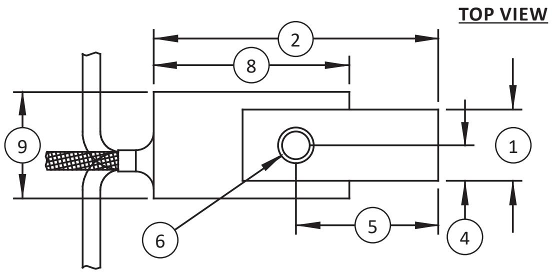
SM S-TYPE LOAD CELL (U.S. & METRIC)





Notes:
**** T indicates tension load direction / primary axis***

DIMENSIONS

See Drawing	CAPACITY			
	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)
	10, 25, 50, 100, 150, 250	50, 100, 200, 500, 1K	500, 1K	2K, 5K
	in	mm	in	mm
(1)	0.50	12.7	1.00	25.4
(2)	2.00	50.8	2.00	50.8
(3)	2.50	63.5	3.00	76.2
(4)	0.25	6.40	0.50	12.7
(5)	1.00	25.4	1.00	25.4
(6)	¼-28 UNF-2B	M6 x 1-6H	½-20 UNF-2B	M12 x 1.75-6H
(7)	1.75	44.5	2.00	50.8
(8)	1.38	35.1	1.94	49.3
(9)	0.75	19.1	1.25	31.8

SMA SERIES MINI S-TYPE LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Proprietary Interface Temperature compensated strain gages
- Performance to 0.05%
- Small compact design
- Tension & compression

SPECIFICATIONS

ACCURACY - (MAX ERROR)		
Nonlinearity – %FS		±0.05
Hysteresis – %FS		±0.05
Nonrepeatability – %RO		± 0.02
Creep, in 20 min – %		± 0.05
TEMPERATURE		
Compensated Range	°F	+15 to +115
	°C	-10 to +45
Operating Range	°F	-65 to +200
	°C	-55 to +90
Effect on Output – % MAX	°F	±0.0008
	°C	±0.0014
Effect on Zero – % RO / °C MAX	°F	±0.005
	°C	±0.009
ELECTRICAL		
Rated Output – mV/V (Nominal)		2.5
Zero Balance – %RO		-0.6 to 0.0
Bridge Resistance – Ohm (Nominal)		350
Excitation Voltage – VDC MAX		15
Insulation Resistance – Megohm		>5000
MECHANICAL		
Calibration		Tension
Safe Overload – %CAP		150
Material		Aluminum

OPTIONS

- Cable length
- Standardized output
- CU.S.tom calibration
- Add connector to cable
- Special Temperature range
- Transducer Electronic Data Sheet (TEDS)

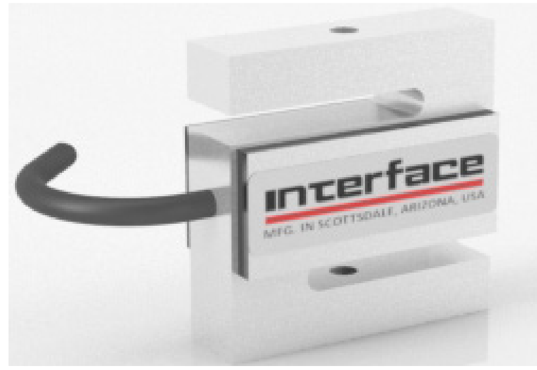
ACCESSORIES

- Instrumentation

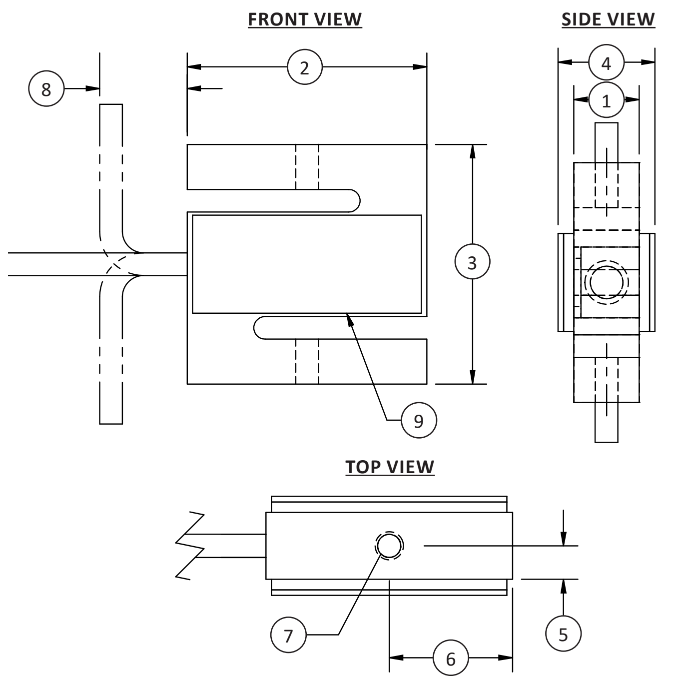
CONNECTOR OPTIONS

- 1.5 m (5 ft) integral cable

STANDARD CONFIGURATION



Model SMA (Shown)



DIMENSIONS

See Drawing	CAPACITY	
	U.S. (lbf)	Metric (N)
	15, 100, 150, 200	60, 500, 600, 900
	in	mm
(1)	0.38	9.5
(2)	1.38	35
(3)	1.38	35
(4)	0.56	14.2
(5)	0.19	4.8
(6)	0.69	17.5
(7)	#10-32 UNF – 2B	M4 X 0.7 – 6
(8)	0.5	12.7
(9)	Identification label	

Catalog 2019 06-15-2020

SML LOW HEIGHT LOAD CELL (U.S. & METRIC)

SPECIFICATIONS

ACCURACY – (MAX ERROR)			
U.S. (lbf)	Metric (N)	Nonlinearity – %FS	Hysteresis – %FS
5 - 300	22 - 1.3K	±0.05	±0.05
500 - 1K	2.2K - 4.5K	±0.10	±0.10
2K	9K	±0.20	±0.10
Nonrepeatability – %RO		±0.03	
Creep, in 20 min – %		±0.05	

TEMPERATURE		
Compensated Range	°F	0 to +150
	°C	-15 to +65
Operating Range	°F	-65 to +200
	°C	-55 to +90
Effect on Output – %	°F	±0.0008
	°C	±0.0015
Effect on Zero – % RO	°F	±0.005
	°C	±0.009

ELECTRICAL	
Rated Output – mV/V (Nominal)	2.0
Zero Balance – %RO	±1.0
Bridge Resistance – Ohm (Nominal)	350
Excitation Voltage – VDC MAX	15
Insulation Resistance – Megohm	> 5000

MECHANICAL		
Calibration		Tension
Safe Overload – %CAP	5 - 10 lbf 22 - 45 N	800
	25 - 2K lbf 110 - 9K N	150

NATURAL FREQUENCY/DEFLECTION				
U.S. (lbf)	**Metric (N)**	**Defelection**		**Natural Frequency (Hertz)**
		in	**mm**	
5 - 10	22 - 45	0.005	0.13	3000
25	110	0.004	0.09	2500
50	220	0.003	0.08	3300
100	450	0.003	0.08	5000
200 - 300	900 - 1.3K	0.003	0.08	4500
500 - 1K	2200 - 4.5K	0.003	0.08	1800
2K	9K	0.004	0.09	1800

Material	5 - 300 (lbf) 22 - 1.3K (N)	Aluminum
	500 - 2K (lbf) 2.2K - 9K (N)	Stainless Steel

STANDARD CONFIGURATION

Model SML (Shown)

FEATURES & BENEFITS

- Proprietary Interface Temperature comp. strain gages
- From 0.75 in (19mm) high
- Performance to 0.05%
- Low extraneoU.S. load sensitivity
- Tension only
- Overload protection, SML-5 and SML-10 (SML-22N and SML-45N)

OPTIONS

- Cable length
- Standarized output
- CU.S.tom calibration
- Transducer Electronic Data Sheet (TEDS)
- Add connector to cable
- Special Temperature range

CONNECTOR OPTIONS

- 5 ft (1.5 m) integral cable

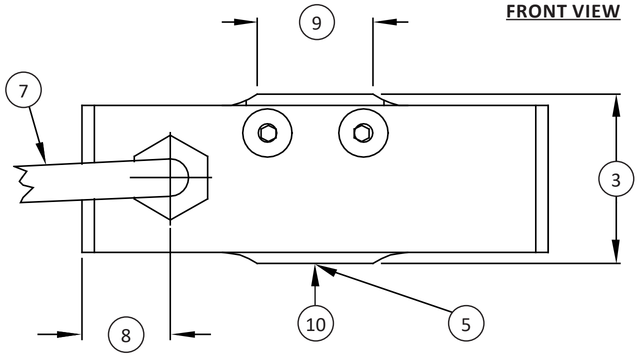
ACCESSORIES

- Instrumentation

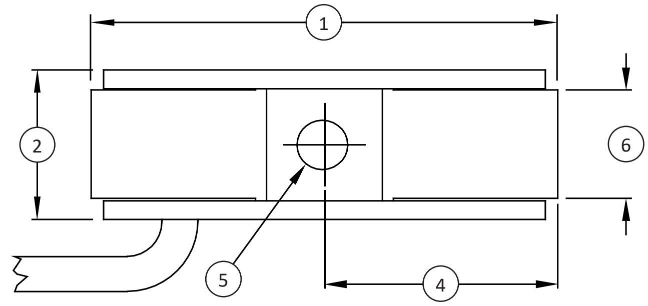
interface
FORCE MEASUREMENT SOLUTIONS.

SML LOW HEIGHT LOAD CELL (U.S. & METRIC)

FRONT VIEW



TOP VIEW



DIMENSIONS

See Drawing	CAPACITY							
	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)
	5 - 10	22 - 45	25, 50, 100	110, 220, 450	200, 300, 500, 1000	900, 1300, 2200, 4500	2000	9000
	in	mm	in	mm	in	mm	in	mm
(1)	1.80	45.7	2.00	50.8	2.12	53.8	2.80	71.1
(2)	0.52	13.1	0.64	16.3	0.89	22.6	1.16	29.6
(3)	0.73	18.5	0.73	18.5	0.98	24.8	1.24	31.5
(4)	0.90	22.9	1.00	25.4	1.06	26.9	1.40	35.6
(5)	10-32 UNF-2B ↧0.20	M5x0.8-6H ↧5.0	¼-28 UNF-2B ↧0.25	M6x1-6H ↧6.0	⅜-24 UNF-2B ↧0.38	M8x1.25-6H ↧8.0	½-20 UNF-2B ↧0.49	M12x1.75-6H ↧12.0
(6)	0.34	8.6	0.46	11.8	0.71	18.1	1.00	25.5
(7)	0.13	3.3	0.13	3.3	0.13	3.3	0.13	3.3
(8)	0.29	7.4	0.38	9.7	0.46	11.7	0.75	19.0
(9)	0.50	12.7	0.50	12.7	0.57	14.5	0.77	19.6
(10)	Live end							

interface
FORCE MEASUREMENT SOLUTIONS.

SMT S-TYPE OVERLOAD PROTECTED LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Proprietary Interface Temperature compensated strain gages
- Overload protected in both tension and compression
- Safe overload to 10X capacity
- Low creep
- 1.1 to 450 lbf (5 - 2000 N)
- High performance

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.05
Hysteresis – %FS		±0.03
Nonrepeatability – %RO		±0.02
Creep, in 20 min – %		±0.025
TEMPERATURE		
Compensated Range	°F	0 to +125
	°C	-15 to +50
Operating Range	°F	-10 to +175
	°C	-25 to +80
Effect on Output – % MAX	°F	±0.0010
	°C	±0.0018
Effect on Zero – %RO MAX	°F	±0.0015
	°C	±0.0027
ELECTRICAL		
Rated Output – mV/V (Nominal)		2.0
Zero Balance – %RO		±3.0
Bridge Resistance – Ohm (Nominal)		350
Excitation Voltage – VDC MAX		15
Insulation Resistance – Megohm		> 5000
MECHANICAL		
Calibration		T & C
Safe Overload – % CAP	1.1, 2.2, 5.6, 11, 22, 56 lbf 5, 10, 25, 50, 100, 250 N	1000
	112, 225, 450 lbf 500, 1000, 2000 N	500

NATURAL FREQUENCY/DEFLECTION				
lbf	N	Deflection in	Deflection mm	Nat. Freq. (Hz)
1.1	5	0.014	0.356	100
2.2	10	0.012	0.305	160
5.6	25	0.011	0.279	260
11	50	0.009	0.229	380
22	100	0.007	0.178	600
56	250	0.006	0.152	900
112	500	0.007	0.178	600
225	1000	0.007	0.178	1200
450	2000	0.007	0.178	1500
Material		Aluminum		

STANDARD CONFIGURATION

Model SMT1-11 (Shown)

OPTIONS

- Cable length
- Standardized outputs
- CU.S.tom calibration
- Transducer Electronic Data Sheets (TEDS)
- Add connector to cable
- Special Temperature range

ACCESSORIES

- Instrumentation
- Mounting hardware

CONNECTION OPTIONS

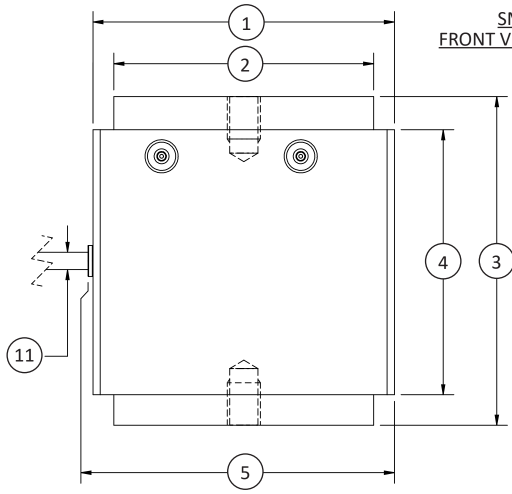
- 5 ft (1.5 m) integral cable

Notes:
Consult factory for more technical information

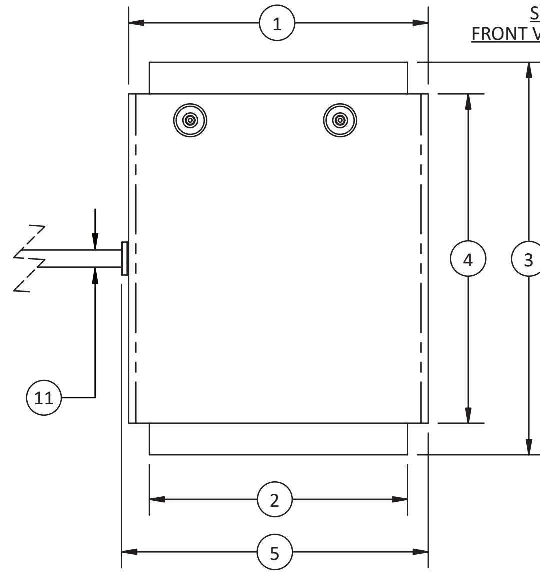
Interface
FORCE MEASUREMENT SOLUTIONS.

SMT S-TYPE OVERLOAD PROTECTED LOAD CELL (U.S. & METRIC)

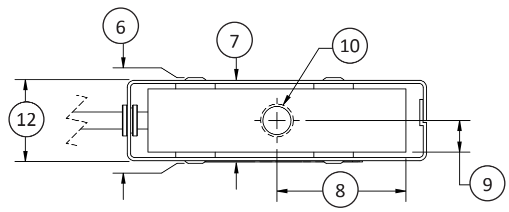
SMT1
FRONT VIEW



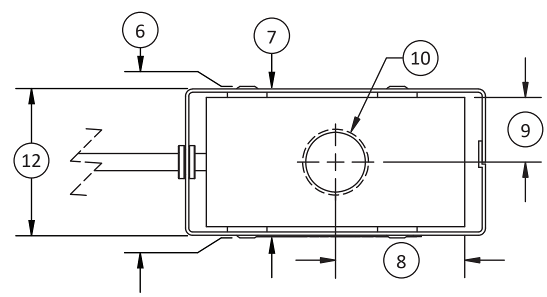
SMT2
FRONT VIEW



SMT1
TOP VIEW



SMT2
TOP VIEW



DIMENSIONS

See Drawing	MODEL			
	SMT1		SMT2	
	CAPACITY			
	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)
	1.1, 2.2, 5.6, 11, 22, 56	5, 10, 25, 50, 100, 250	112, 225, 450	500, 1000, 2000
	in	mm	in	mm
(1)	2.28	57.8	2.28	57.8
(2)	1.96	49.8	1.96	49.8
(3)	2.48	63.0	2.98	75.7
(4)	2.00	50.8	2.50	63.5
(5)	2.33	59.2	2.33	59.1
(6)	0.65	16.5	1.15	29.2
(7)	0.60	15.2	1.11	28.2
(8)	0.98	24.9	0.98	24.9
(9)	0.24	6.1	0.49	12.4
(10)	¼-28 UNF-3B ↧ 0.31	M6 x 1-6H ↧ 8.0	½-20 UNF-3B ↧ 0.57	M12 x 1.75-6H ↧ 14.5
(11)	Ø0.13	Ø3.3	Ø0.13	Ø3.3
(12)	0.48	12.2	1.11	28.2

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SMTM MICRO S-TYPE LOAD CELL (U.S. & METRIC)

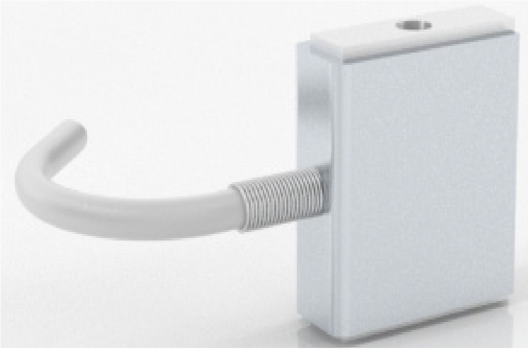
FEATURES & BENEFITS

- Capacity 5, 25, 50 lbf (20, 100, 200 N)
- Can be U.S.ed in tension & compression
- Micro sized – 0.68 x 0.75 x 0.29 in (17.3 x 19.1 x 7.3 mm)
- Excellent Temperature compensation (0.005% / °F Temperature effect on output)
- Overload protected up to 10x capacity

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.1
Hysteresis – %FS		±0.1
Nonrepeatability – %RO		±0.05
Creep, in 20 min – %		±0.1
TEMPERATURE		
Compensated Range	°F	+60 to +165
	°C	+15 to +75
Operating Range	°F	-55 to +200
	°C	-50 to +95
Effect on Output – % MAX	°F	±0.005
	°C	±0.010
Effect on Zero – %RO MAX	°F	±0.015
	°C	±0.018
ELECTRICAL		
Rated Output – mV/V (Nominal)		2.0
Zero Balance – %RO		±3.0
Bridge Resistance – Ohm (Nominal)		350
Excitation Voltage – VDC MAX		5
Insulation Resistance – Megohm		> 2500
MECHANICAL		
Calibration		Tension
Safe Overload – % CAP		1000**
Material	5 (lbf) 20 (N)	Aluminum
	25 - 50 (lbf) 100 - 200 (N)	Alloy Steel

STANDARD CONFIGURATION



Model SMTM (Shown)

OPTIONS

- Cable length
- CU.S.tom calibration
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- Add connector to cable
- Special Temperature range

ACCESSORIES

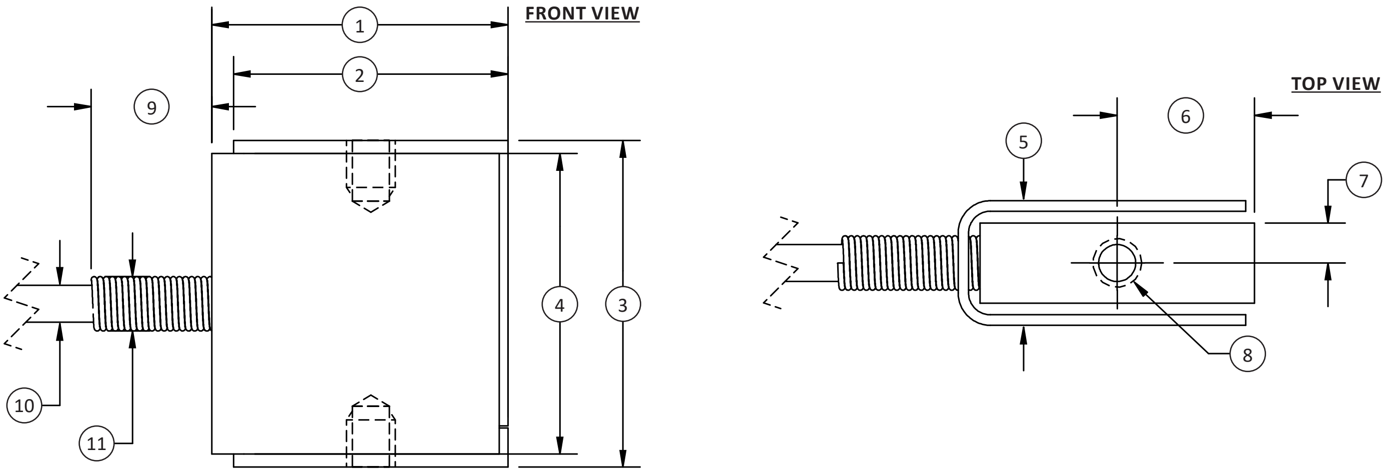
- Instrumentation
- Mounting hardware

CONNECTION OPTIONS

- 5 ft (1.5 m) integral cable

50 lbf capacity rated to 200% CAP
Consult factory for more technical information

SMTM MICRO S-TYPE LOAD CELL (U.S. & METRIC)



DIMENSIONS

See Drawing	U.S. (lbf)	Metric (N)
	5, 25, 50	20, 100, 200
	in	mm
(1)	0.68	17.3
(2)	0.63	16.0
(3)	0.75	19.1
(4)	0.69	17.5
(5)	0.29	7.3
(6)	0.32	8.0
(7)	0.09	2.3
(8)	#4-40 UNC-2B ↧ 0.11	M3x0.5-6H ↧ 2.8
(9)	0.27	6.9
(10)	Ø0.08	Ø2.1
(11)	Ø0.13	Ø3.3

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FORCE MEASUREMENT SOLUTIONS.

SSB SEALED BEAM LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Proprietary Interface Temperature compensated strain gages
- Environmentally sealed
- 0.01% non-repeatability
- 0.0008%/°F temp. effect on output
- Tension and compression
- Compact size

SPECIFICATIONS

CAPACITY	50 - 5K lbf (222 - 22.2K N)	10K lbf (44.5K N)
ACCURACY – (MAX ERROR)		
Nonlinearity – %FS	±0.03	
Hysteresis – %FS	±0.02	±0.03
Nonrepeatability – %RO	± 0.01	
Creep, in 20 min – %	± 0.025	
TEMPERATURE		
Compensated Range °F	0 to +150	
Compensated Range °C	-15 to +65	
Operating Range °F	-65 to +200	
Operating Range °C	-55 to +90	
Effect on Output – % / °F MAX	±0.008	
Effect on Zero – %RO / °F MAX	±0.15	
ELECTRICAL		
Rated Output – mV/V (Nominal)	3.0	
Zero Balance – %RO	±1.0	
Bridge Resistance – Ohm (Nominal)	350	
Excitation Voltage – VDC MAX	15	
Insulation Resistance – Megohm	5000	
MECHANICAL		
Calibration	Compression	
Safe Overload – %CAP	±150	

NATURAL FREQUENCY/DEFLECTION

lbf	N	Deflection in	Deflection mm	Nat. Freq. (Hz)
50	222	0.004	0.1016	2130
100	445	0.004	0.1016	2400
250	1.11K	0.005	0.127	3000
500	2.22K	0.010	0.254	2220
1K	4.45K	0.013	0.3302	1970
2.5K	11.1K	0.025	0.635	1720
5K	22.2K	0.022	0.5588	1400
10K	44.5K	0.026	0.6604	1620

Material	Range	
Material	50 - 2.5K lbf / 222 - 11.1K N	Aluminum
Material	5K - 10K lbf / 22.2K - 44.5K N	Alloy Steel

STANDARD CONFIGURATION

Model SSB (Shown)

OPTIONS

- Standardized output
- Cable length
- Transducer Electronic Data Sheet (TEDS)
- Special Temperature range
- CU.S.tom calibration
- Add connector to cable

ACCESSORIES

- Instrumentation

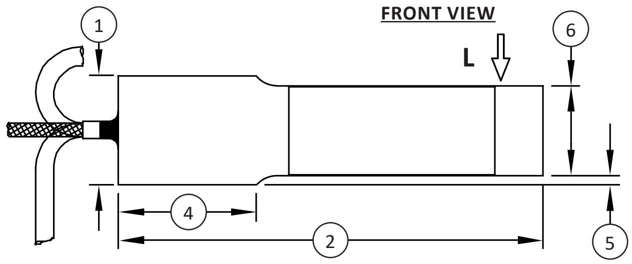
CONNECTOR OPTIONS

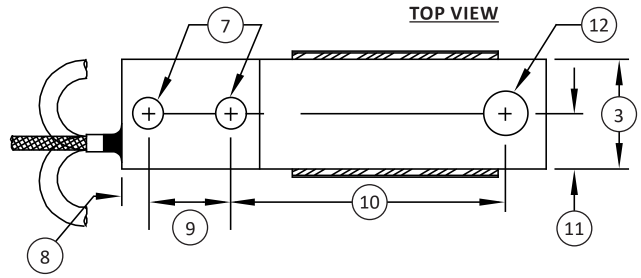
- 10 ft (3 m) integral cable

Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

INTERFACE FORCE MEASUREMENT SOLUTIONS.

SSB SEALED BEAM LOAD CELL (U.S. & METRIC)





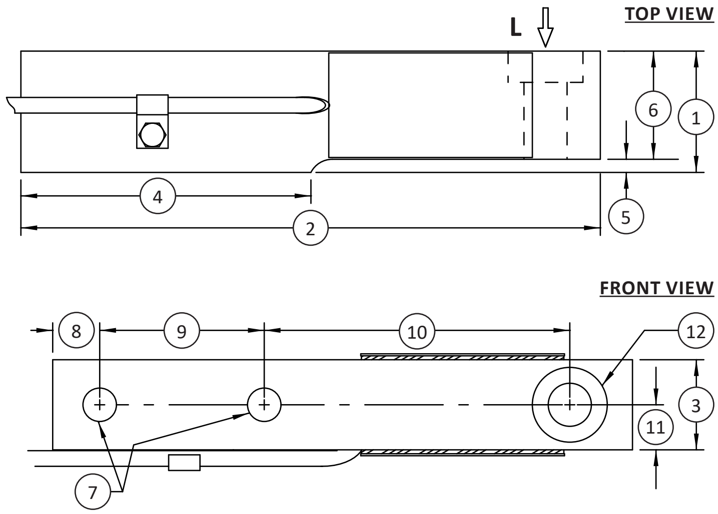
Notes:
**** L indicates load direction***

DIMENSIONS

See Drawing	CAPACITY									
	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)
	50	**222**	**100**	**445**	**250**	**1.11K**	**500**	**2.22K**	**1K**	**4.45K**
	in	mm	in	mm	in	mm	in	mm	in	mm
(1)	0.98	24.9	0.98	24.9	0.98	24.9	1.00	25.4	1.50	38.1
(2)	2.38	60.5	2.38	60.5	2.38	60.5	3.88	98.6	5.00	127
(3)	0.50	12.7	0.50	12.7	0.50	12.7	1.00	25.4	1.00	25.4
(4)	0.97	24.6	0.97	24.6	0.97	24.6	1.25	31.8	1.75	44.5
(5)	0.11	2.8	0.15	3.9	0.11	2.8	0.09	2.3	0.10	2.5
(6)	0.82	20.8	0.73	18.4	0.82	20.8	0.82	20.8	1.36	34.5
(7)	Ø0.17	Ø4.3	Ø0.17	Ø4.3	Ø0.17	Ø4.3	Ø0.28	Ø7.1	Ø0.41	Ø10.3
(8)	0.25	6.4	0.25	6.4	0.25	6.4	0.25	6.4	0.38	9.7
(9)	0.50	12.7	0.50	12.7	0.50	12.7	0.75	19.1	1.00	25.4
(10)	1.31	33.3	1.31	33.3	1.31	33.3	2.50	63.5	3.25	82.6
(11)	0.25	6.4	0.25	6.4	0.25	6.4	0.50	12.7	0.50	12.7
(12)	Ø0.17	Ø4.3	Ø0.17	Ø4.3	Ø0.17	Ø4.3	Ø0.40	Ø10.2	Ø0.40	Ø10.2

Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

SSB SEALED BEAM LOAD CELL (U.S. & METRIC)



Notes:
**** L indicates load direction***

DIMENSIONS (CONTINUED)

See Drawing	CAPACITY			
	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)
	2.5K - 5K	11.1K - 22.2K	10K	44.5K
	in	mm	in	mm
(1)	1.45	36.8	1.94	49.3
(2)	8.00	203.0	9.25	235.0
(3)	1.44	36.6	1.44	36.6
(4)	3.75	95.0	4.63	117.0
(5)	0.10	2.5	0.21	5.3
(6)	1.35	34.3	1.73	44
(7)	Ø0.53	Ø13.0	Ø0.53	Ø13.5
(8)	0.75	19.0	0.75	19.0
(9)	2.50	63.5	2.63	66.8
(10)	3.88	98.6	4.88	124.0
(11)	0.72	18.3	0.72	18.3
(12)	Ø0.69	Ø17.5	Ø0.69	Ø17.5

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

SPI PLATFORM SCALE LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Proprietary Interface Temperature compensated strain gages
- 0.01% non-repeatability
- 400% compression overload protection
- 0.0008% / °F temp. effect on output
- Eccentric load compensated
- Space saving narrow hoU.S.ing per DIN EN 50022

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.02
Hysteresis – %FS		±0.02
Nonrepeatability – %RO		±0.01
Creep, in 20 min – %		±0.025
Eccentric Load Sensitivity – % / in		0.012
TEMPERATURE		
Compensated Range	°F	+15 to +115
	°C	-10 to +45
Operating Range	°F	-65 to +200
	°C	-55 to +90
Effect on Output – % / °F MAX		±0.0008
Effect on Zero – %RO / °F MAX		±0.0015
ELECTRICAL		
Rated Output – mV/V (Nominal)		3.0
Zero Balance – %RO		±5.0
Bridge Resistance – Ohm (Nominal)		350
Excitation Voltage – MAX VDC		15
Insulation Resistance – Megohm		5000
MECHANICAL		
Calibration		Comp.
Safe Overload – %CAP		400

NATURAL FREQUENCY/DEFLECTION				
lbf	N	Deflection in	Deflection mm	Nat. Freq. – Hertz
3	13.3	0.015	0.38	130
7.5	33.4	0.009	0.23	220
15	66.7	0.009	0.23	220
Material				Aluminum

STANDARD CONFIGURATION

Model SPI (Shown)

OPTIONS

- Standardized output
- CU.S.tom calibration
- Transducer Electronic Data Sheet (TEDS)
- Add connector to cable
- Special Temperature range

ACCESSORIES

- Instrumentation

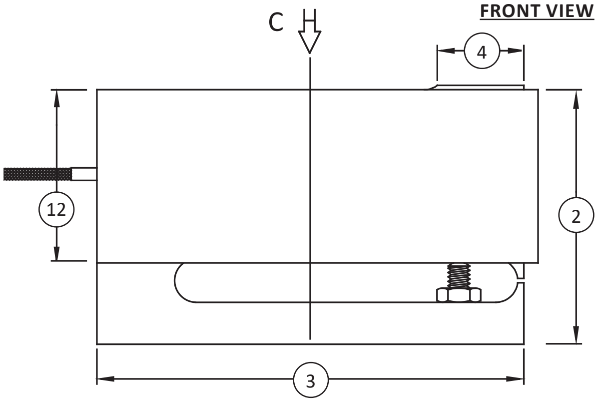
CONNECTOR OPTIONS

- 5 ft (1.5 m) integral cable

* Consult factory for more technical information
Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

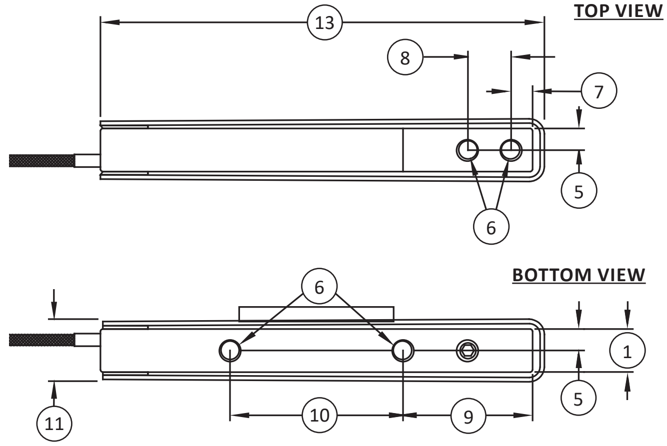
SPI PLATFORM SCALE LOAD CELL (U.S. & METRIC)

FRONT VIEW



TOP VIEW

BOTTOM VIEW



Notes:
**** C indicates compression load direction / primary axis***

DIMENSIONS

See Drawing	CAPACITY					
	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)
	3	13.3	7.5	33.4	15	66.7
	in	mm	in	mm	in	mm
(1)	0.38	9.60	0.50	12.7	1.00	25.4
(2)	2.99	75.9	2.99	75.9	2.99	75.9
(3)	5.00	127	5.00	127	5.00	127
(4)	1.00	25.4	1.00	25.4	1.00	25.4
(5)	0.19	4.80	0.25	6.40	0.5	12.7
(6)	10-32 UNF-2B ↧ 0.50	10-32 UNF-2B ↧ 12.7	¼-28 UNF-2B ↧ 0.56	¼-28 UNF-2B ↧ 14.2	¼-28 UNF-2B ↧ 0.56	¼-28 UNF-2B ↧ 14.2
(7)	0.25	6.40	0.25	6.40	0.25	6.40
(8)	0.50	12.7	0.50	12.7	0.50	12.7
(9)	1.50	38.1	1.50	38.1	1.50	38.1
(10)	2.00	50.8	2.00	50.8	2.00	50.8
(11)	0.62	15.7	0.75	19.0	1.25	31.8
(12)	2.00	50.8	2.00	50.8	2.00	50.8
(13)	5.13	130.3	5.13	130.3	5.13	130.3

Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

SPI PLATFORM HIGH CAPACITY SCALE LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities: 25, 50, 100, 150 lbf (111, 222, 445, 667 N)
- Proprietary Interface Temperature compensated strain gages
- 0.01% non-repeatability
- Safe overload to 200%
- 0.0008%/°F temp. effect on output
- Eccentric load compensated

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.02
Hysteresis – %FS		±0.02
Nonrepeatability – %RO		±0.01
Creep, in 20 min – %		±0.025
Eccentric Load Sensitivity – % / in		0.012
TEMPERATURE		
Compensated Range	°F	+15 to +115
	°C	-10 to +45
Operating Range	°F	-65 to +200
	°C	-55 to +90
Effect on Output – % / °F MAX		±0.0008
Effect on Zero – %RO / °F MAX		±0.0015
ELECTRICAL		
Rated Output – mV/V (Nominal)		3.0
Zero Balance – %RO		±5.0
Bridge Resistance – Ohm (Nominal)		350
Excitation Voltage – VDC MAX		15
Insulation Resistance – Megohm		5000
MECHANICAL		
Calibration		Compression
Safe Overload – %CAP		200

NATURAL FREQUENCY/DEFLECTION				
lbf	N	Deflection		Nat. Freq. – Hertz
		in	mm	
25	111	0.008	0.20	240
50	222	0.008	0.20	310
100	445	0.007	0.18	470
150	667	0.005	0.13	580
Material		Aluminum		

STANDARD CONFIGURATION

Model SPI (Shown)

OPTIONS

- Cable length
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- Special Temperature range
- Add connector to cable

ACCESSORIES

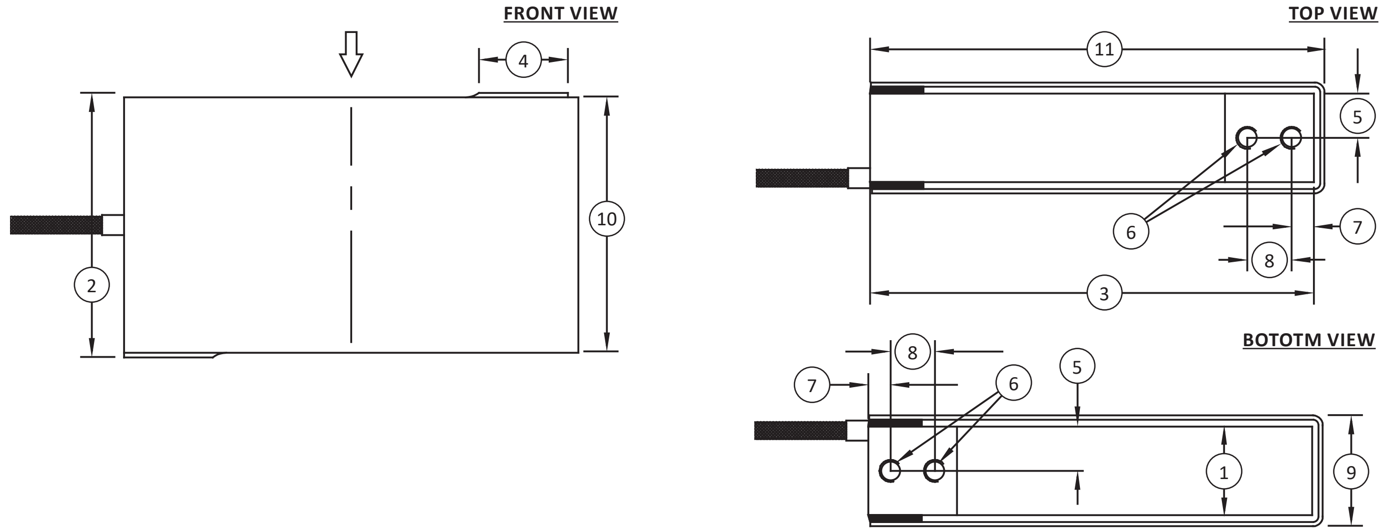
- Instrumentation

CONNECTOR OPTIONS

- 5 ft (1.5 m) integral cable

* Consult factory for more technical information.
Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

SPI PLATFORM HIGH CAPACITY SCALE LOAD CELL (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITY			
	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)
	25, 50	111, 222	100, 150	445, 667
	in	mm	in	mm
(1)	1.00	25.4	1.00	25.4
(2)	3.00	76.2	3.00	76.2
(3)	5.00	127	6.00	152.4
(4)	1.00	25.4	1.50	38.1
(5)	0.50	12.7	0.50	12.7
(6)	¼-28 UNF-2B ↧ 0.56	¼-28 UNF-2B ↧ 14.2	¼-28 UNF-2B ↧ 0.56	¼-28 UNF-2B ↧ 14.2
(7)	0.25	6.4	0.25	6.4
(8)	0.50	12.7	1.00	25.4
(9)	1.25	31.8	1.25	31.8
(10)	2.88	73.0	2.88	73.0
(11)	5.12	130	6.12	155.4

Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

FORCE MEASUREMENT SOLUTIONS.

SSM/SSM2 SEALED S-TYPE LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Proprietary Interface Temperature compensated strain gages
- Environmentally sealed
- 0.02% non-repeatability
- 0.0008%/°F (0.0015%/°C) temp. effect on output
- 0.025% creep
- Tension and compression

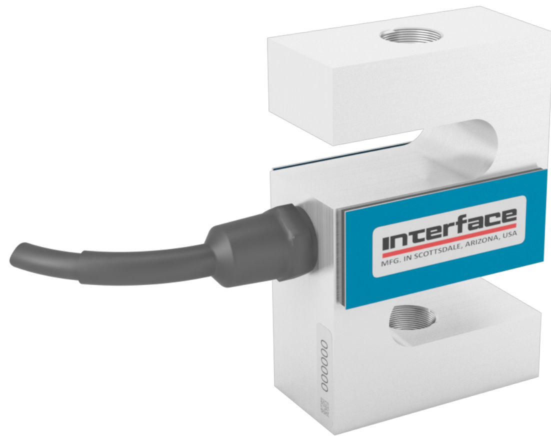
SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.05
Hysteresis – %FS		±0.03
Nonrepeatability – %RO		±0.02
Creep, in 20 min – %		±0.025
TEMPERATURE		
Compensated Range	°F	0 to +150
	°C	-15 to +65
Operating Range	°F	-65 to +200
	°C	-55 to +90
Effect On Output – %MAX	°F	±0.0008
	°C	±0.0015
Effect On Zero – %RO MAX	°F	±0.0015
	°C	±0.0027
ELECTRICAL		
Rated Output – mV/V (Nominal)		3
Zero Balance – %RO		±1
Bridge Resistance – Ohm (Nominal)		350
Excitation Voltage – VDC MAX		15
Insulation Resistance – Megohm		> 5000
MECHANICAL		
Calibration		Tension
Safe Overload – % CAP		150

NATURAL FREQUENCY/DEFLECTION				
lbf	N	Deflection		Nat. Freq. (Hz)
		in	mm	
50	200	0.003	0.08	1500
100	500	0.004	0.1	1850
150	500	0.004	0.1	1850
250	1K	0.006	0.15	2350
500	2K	0.005	0.13	2150
750	N/A	0.005	0.13	2350
1K	5K	0.005	0.13	3350
2K	10K	0.005	0.13	2400
3K	N/A	0.005	0.13	3000
5K	20K	0.005	0.13	2520

Material	50 - 1K lbf	Aluminum
	200 - 5K N	
	2K - 5K lbf	Alloy steel
	10K - 20K N	

STANDARD CONFIGURATION



MODEL SSM/SSM2 (Shown)

OPTIONS

- PC04E-10-6P connector on load cell body (SSM-500 lbf / SSM-2 kN and above)
- Standardized output
- Special Temperature range
- Cable length
- Transducer Electronic Data Sheets (TEDS)
- Add connector to cable

ACCESSORIES

- Load button
- Instrumentation
- Mounting hardware

CONNECTOR OPTIONS

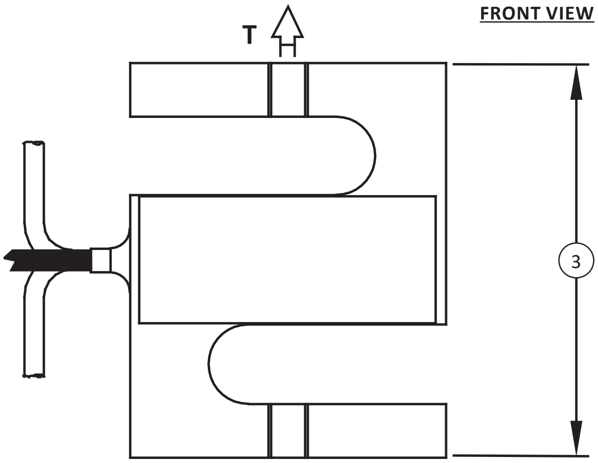
- 10 ft (3 m) integral cable

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

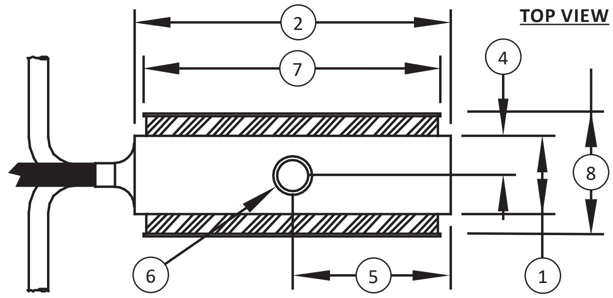
interface
FORCE MEASUREMENT SOLUTIONS.

SSM/SSM2 SEALED S-TYPE LOAD CELL (U.S. & METRIC)

FRONT VIEW



TOP VIEW



Notes:
** T indicates tension load direction / primary axis*

DIMENSIONS

See Drawing	MODEL													
	SSM												SSM2	
	CAPACITY													
	U.S. (lbf)	**Metric (N)**	**U.S. (lbf)**	**Metric (N)**	**U.S. (lbf)**	**Metric (N)**	**U.S. (lbf)**	**Metric (N)**	**U.S. (lbf)**	**Metric (N)**	**U.S. (lbf)**	**Metric (N)**	**U.S. (lbf)**	**Metric (N)**
	50	**200**	**100, 150, 250**	**500, 700, 1000**	**500**	**2K**	**750, 1K**	**2.5K, 3K, 5K**	**2K, 3K**	**10K**	**5K**	**20K**	**5K**	**25K**
	in	**mm**	**in**	**mm**	**in**	**mm**	**in**	**mm**	**in**	**mm**	**in**	**mm**	**in**	**mm**
(1)	0.50	12.7	0.50	12.7	1.00	25.4	1.00	25.4	0.98	24.9	1.50	38.1	1.48	37.6
(2)	2.00	50.8	2.00	50.8	2.00	50.8	2.00	50.8	1.98	50.3	2.50	63.5	2.98	75.7
(3)	2.50	63.5	2.50	63.5	3.00	76.2	3.00	76.2	2.98	75.7	3.50	88.9	3.98	101.1
(4)	0.25	6.40	0.25	6.40	0.50	12.7	0.50	12.7	0.50	12.7	0.75	19.1	0.74	18.8
(5)	1.00	25.4	1.00	25.4	1.00	25.4	1.00	25.4	1.00	25.4	1.25	31.8	1.49	37.8
(6)	¼-28 UNF-2B	M6 x 1-6H	¼-28 UNF-2B	M6 x 1-6H	½-20 UNF-2B	M12 x 1.75-6H	½-20 UNF-2B	M12 x 1.75-6H	½-20 UNF-2B	M12 x 1.75-6H	⅝-18 UNF-2B	M16 x 2-6H	¾-16 UNF-2B	M20 x 1.5-6H
(7)	1.88	47.8	1.88	47.8	1.88	47.8	1.88	47.8	1.88	47.8	2.38	60.5	2.88	73.2
(8)	0.82	20.8	0.72	18.3	1.18	30.0	1.25	31.8	1.23	31.2	1.75	44.5	1.76	44.8

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

SSM-FDH HIGH TEMPERATURE S-TYPE LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Proprietary Interface Temperature compensated strain gages
- Environmentally sealed
- Tension and compression

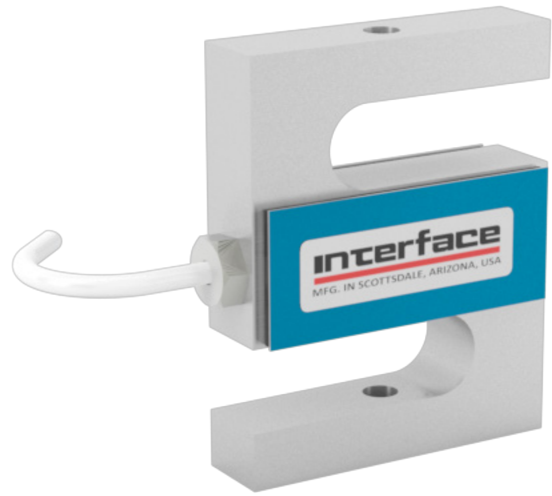
SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.05
Hysteresis – %FS		±0.03
Nonrepeatability – %RO		± 0.02
Creep, in 20 min – %		± 0.03
TEMPERATURE		
Compensated Range	°F	0 to +300
	°C	-20 to +150
Operating Range	°F	-65 to +320
	°C	-50 to +160
Effect on Output – % MAX	°F	±0.0008
	°C	±0.0015
Effect on Zero – %RO MAX	°F	±0.0008
	°C	±0.0015
ELECTRICAL		
Rated Output – mV/V (Nominal)		3
Zero Balance – %RO		±1
Bridge Resistance – Ohm (Nominal)		350
Excitation Voltage – VDC MAX		15
Insulation Resistance – Megohm		> 5000
MECHANICAL		
Calibration		Tension
Safe Overload – %CAP		150

NATURAL FREQUENCY/DEFLECTION

lbf	N	Deflection in	Deflection mm	Nat. Freq. (Hz)
50	200	0.08	0.003	1500
100	500	0.004	0.10	1850
150	667	0.004	0.10	1850
250	1K	0.006	0.15	2350
500	2K	0.005	0.127	2150
750	N/A	0.005	0.127	2350
1K	5K	0.005	0.127	3350
2K	10K	0.005	0.127	2400
3K	N/A	0.005	0.127	3000
5K	20K	0.005	0.127	2520
Material				Aluminum

STANDARD CONFIGURATION



MODEL SSM-FDH (Shown)

OPTIONS

- Add connector to cable
- Standardized output
- Cable length
- Transducer Electronic Data Sheet (TEDS)

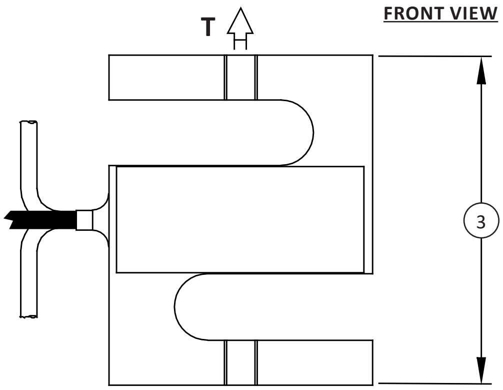
ACCESSORIES

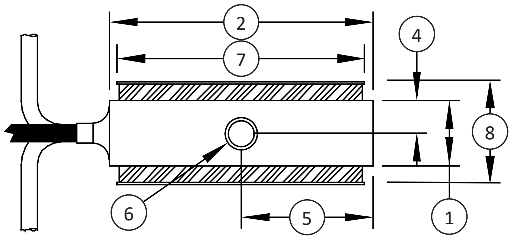
- Instrumentation
- Mounting hardware
- Load button

CONNECTOR OPTIONS

- 15 ft (4.5 m) integral cable

SSM-FDH HIGH TEMPERATURE S-TYPE LOAD CELL (U.S. & METRIC)





Notes:
**** T indicates tension load direction / primary axis***

DIMENSIONS

See Drawing	CAPACITY	
	U.S. (lbf)	Metric (N)
	50, 100, 150, 250, 500, 750, 1K, 2K, 3K, 5K	200, 500, 1K, 2K, 5K, 10K, 20K
	in	mm
(1)	0.50	12.7
(2)	2.00	50.8
(3)	2.50	63.5
(4)	0.25	6.40
(5)	1.00	25.4
(6)	¼-28 UNF-2B	M6 x 1-6H
(7)	1.88	47.8
(8)	0.72	18.3

FORCE MEASUREMENT SOLUTIONS.

SSMF FATIGUE RATED S-TYPE LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Fatigue-rated: $1x10^7$ fully reversed cycles
- Proprietary Interface Temperature compensated strain gages
- Capacities 25 to 2.5K lbf (100 to 10K N)
- Environmentally sealed
- 0.02% nonrepeatability
- Near zero temp. effect on output – 0.0008%/°F (0.0015%/°C)
- Very low creep – 0.025%
- Tension and compression

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.05
Hysteresis – %FS		±0.03
Nonrepeatability – %RO		±0.02
Creep, in 20 min – %		±0.025
TEMPERATURE		
Compensated Range	°F	0 to +150
	°C	-15 to +65
Operating Range	°F	-65 to +200
	°C	-55 to +90
Effect on Output – % MAX	°F	±0.0008
	°C	±0.0015
Effect on Zero – %RO MAX	°F	±0.0015
	°C	±0.0027
ELECTRICAL		
Rated Output – mV/V (Nominal)		1.5
Zero Balance – %RO		±1.0
Bridge Resistance – Ohm (Nominal)		350
Excitation Voltage – VDC MAX		15
Insulation Resistance – Megohm		> 5000
MECHANICAL		
Calibration		Tension
Safe Overload – %CAP		300
Deflection	in	0.002 to 0.003
	mm	0.05 to 0.08
Nat. Freq (Hz)		1500 to 3300
Fatigue-Rated		$1x10^7$ fully reversed loading cycles
Material	25 -500 lbf 100 - 2.5K N	Aluminum
	1K - 2.5K lbf 5K - 10K N	Alloy steel

STANDARD CONFIGURATION

Model SSMF (Shown)

OPTIONS

- RC04E-10-6P connector – 250 lbf (11.1 kN) & higher on load cell body
- Standardized output
- Special Temperature range
- Cable length
- Add connector cable
- Transducer Electronic Data Sheet (TEDS)

ACCESSORIES

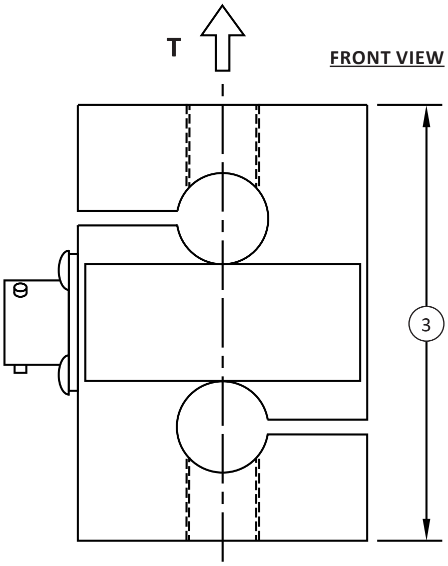
- Instrumentation
- Mounting hardware
- Load button

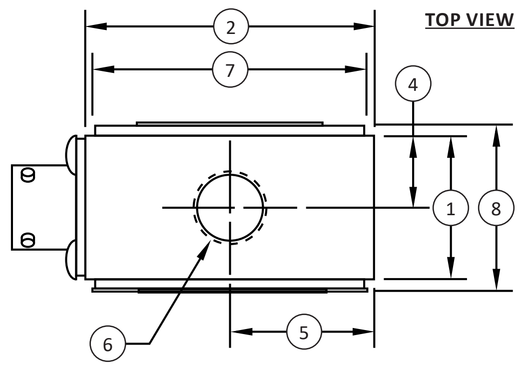
CONNECTOR OPTIONS

- 10 ft (3 m) integral cable

interface
FORCE MEASUREMENT SOLUTIONS.

SSMF FATIGUE RATED S-TYPE LOAD CELL (U.S. & METRIC)





Notes:
**** T indicates tension load direction / primary axis***

DIMENSIONS

See Drawing	CAPACITY							
	U.S. (lbf)	**Metric (N)**	**U.S. (lbf)**	**Metric (N)**	**U.S. (lbf)**	**Metric (N)**	**U.S. (lbf)**	**Metric (N)**
	25	**100**	**50, 125**	**250, 500**	**250, 500, 1K**	**1K, 2.5K, 5K**	**2.5K**	**10K**
	in	**mm**	**in**	**mm**	**in**	**mm**	**in**	**mm**
(1)	0.50	12.7	0.50	12.7	1.00	25.4	1.50	38.1
(2)	2.00	50.8	2.00	50.8	2.00	50.8	2.50	63.5
(3)	2.50	63.5	2.50	63.5	3.00	76.2	3.50	88.9
(4)	0.25	6.40	0.25	6.40	0.50	12.7	0.75	19.1
(5)	1.00	25.4	1.00	25.4	1.00	25.4	1.25	31.8
(6)	¼-28 UNF-2B	M6 x 1-6H	¼-28 UNF-2B	M6 x 1-6H	½-20 UNF-2B	M12 x 1.75-6H	⅝-18 UNF-2B	M16 x 2-6H
(7)	1.88	47.8	1.88	47.8	1.88	47.8	2.38	60.5
(8)	0.82	20.8	0.72	18.3	1.22	31.0	1.75	44.5

SSMH SEALED S-TYPE LOAD CELL FOR HAZARDOU.S. ENVIRONMENTS (U.S. &

FEATURES & BENEFITS

- Tension and compression
- Environmentally sealed IP65
- Certified for U.S.e in hazardoU.S. locations when installed per supplied instructions
- High Temperature rated, up to 290°F (143°C)
- Ex ib IIC T4 Gb (-40° < Ta < 112°C)
- Ex ib IIIC T160°C Db (-40° < Ta < 143°C)
- 15 ft (5 m) cable

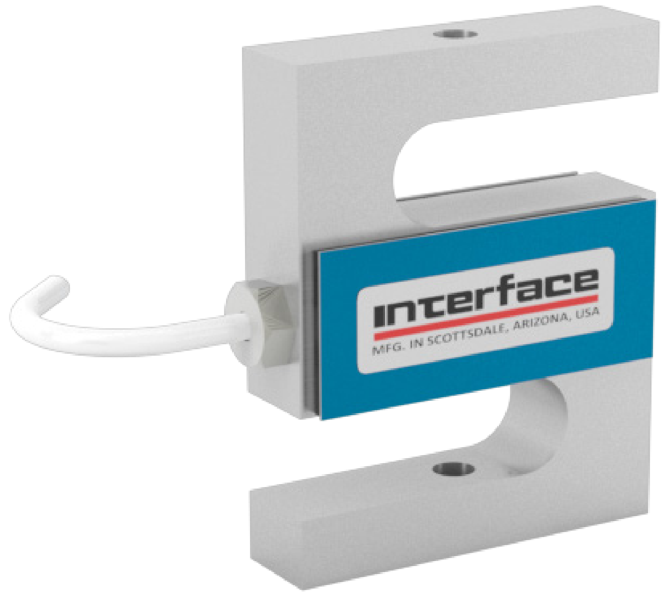
SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.05
Hysteresis – %FS		±0.03
Nonrepeatability – %RO		± 0.02
Creep, in 20 min – %		± 0.025
TEMPERATURE		
Compensated Range	°F	0 to +150
	°C	-15 to +65
Operating Range	°F	-40 to +290
	°C	-40 to +143
Effect on Zero – %RO MAX	°F	±0.0015
	°C	±0.0027
ELECTRICAL		
Rated Output – mV/V (Nominal)		3
Zero Balance – %RO		±1
Bridge Resistance – Ohm (Nominal)		350
Excitation Voltage – VDC MAX		15
Insulation Resistance – Megohm		> 5000
MECHANICAL		
Calibration		Tension
Safe Overload – %CAP		150

NATURAL FREQUENCY/DEFLECTION				
lbf	N	Deflection in	Deflection mm	Nat. Freq. (Hz)
50	200	0.003	0.08	1500
100	500	0.004	0.1	1850
150	700	0.004	0.1	2000
250	1K	0.006	0.15	2350
500	2K	0.005	0.13	2150
750	3K	0.005	0.13	2350
1K	5K	0.005	0.13	3350
2K	10K	0.005	0.13	2400
3K	15K	0.005	0.13	3000
5K	20K	0.005	0.13	2520

Material	50 to 1K lbf	Aluminum
	200 to 5K N	
	2K to 5K lbf	Alloy steel
	10K to 20K N	

STANDARD CONFIGURATION



Model SSMH (Shown)

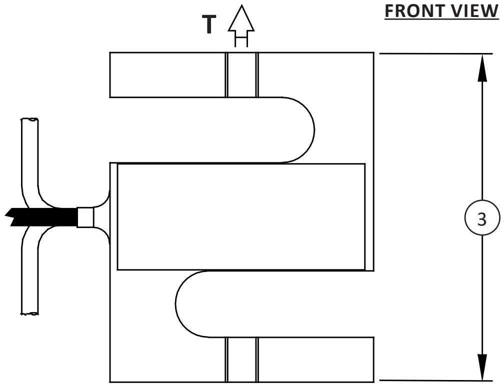
INTRINSIC SAFETY ENTITY PARAMETERS	
Ui	20 V
Ii	460 mA
Pi	1.3 W
Ci*	15 nF
Li*	51 µH

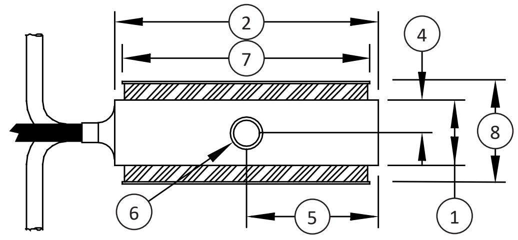
With up to 300 ft (100 m) cable

OPTIONS

- Cable length
- CU.S.tom calibration
- Special Temperature range

SSMH SEALED S-TYPE LOAD CELL FOR HAZARDOU.S. ENVIRONMENTS (U.S. &





Notes:
** T indicates tension load direction / primary axis*

DIMENSIONS

See Drawing	CAPACITY					
	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)
	50, 100, 150, 250	200 , 500, 700, 1K	500, 750, 1K,2K, 3K	2K, 3K, 5K, 10K, 15K	5K	20K
	in	mm	in	mm	in	mm
(1)	0.50	12.7	1.00	25.4	1.50	38.1
(2)	2.00	50.8	2.00	50.8	2.50	63.5
(3)	2.50	63.5	3.00	76.2	3.50	88.9
(4)	0.25	6.40	0.50	12.7	0.75	19.1
(5)	1.00	25.4	1.00	25.4	1.25	31.8
(6)	¼-28 UNF-2B	M6 x 1-6H	½-20 UNF-2B	M12 x 1.75-6H	⅝-18 UNF-2B	M16 x 2-6H
(7)	1.88	47.8	1.88	47.8	2.38	60.5
(8)	0.70	17.8	1.20	35.0	1.72	43.7

ULC ULTRA LOW CAPACITY LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

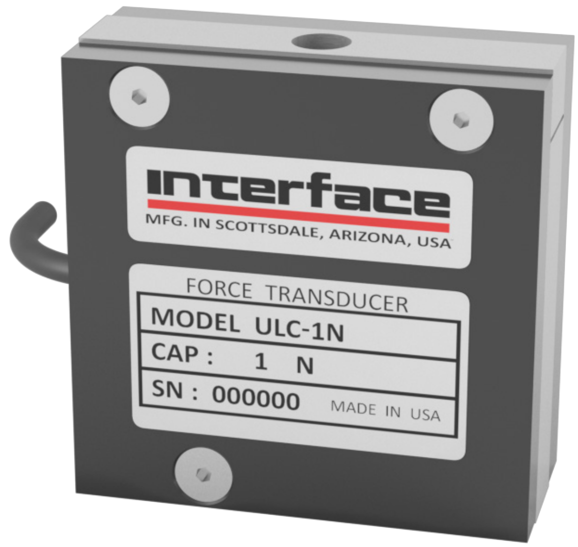
- Proprietary Interface Temperature compensated strain gages
- Highest performance gram cell in the world
- Overload protected
- Safe side load overload to 5X capacity
- Low extraneoU.S. load sensitivity
- Low Temperature effect on zero (0.002%/°F)
- Capacity down to 50 grams
- Tension and compression

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.05
Hysteresis – %FS		±0.05
Nonrepeatability – %RO		±0.05
Creep, in 20 min – %	(0.5 N)	±0.1
	(0.11 lbf)	
	(All others)	±0.05
TEMPERATURE		
Compensated Range	°C	-10 to +45
	°F	+15 to +115
Operating Range	°C	-55 to +90
	°F	-65 to +200
Effect on Output – % MAX	°C	±0.002
	°F	±0.001
Effect on Zero – %RO MAX	°C	±0.004
	°F	±0.002
ELECTRICAL		
Rated Output – mV/V (Nominal)	(0.5 N)	±1.5
	(0.11 lbf)	
	(All others)	±2.0
Zero Balance – %RO (horiz.)		±2.0
Input Resistance – Ohms		350 (+35/-3.5)
Output Resistance – Ohms		350 (±3.5)
Excitation Voltage – VDC MAX		12
Insulation Resistance – Megohms		> 5000
MECHANICAL		
Calibration		Tension
Safe Axial Overload – %CAP		±1000
Safe Side Overload – %CAP		±500
Safe Load Axis Moment – %CAP x 1 in		±500

NATURAL FREQUENCY/DEFLECTION				
N	lbf	Deflection mm	Deflection in	Nat. Freq. (Hz)
0.5	0.11	0.2794	0.011	120
1	0.22	0.2794	0.011	125
2	0.45	0.2032	0.008	200
Material		Aluminum		

STANDARD CONFIGURATION



Model ULC-1N (Shown)

OPTIONS

- Cable length
- Transducer Electronic Data Sheets (TEDS)
- CU.S.tom calibration
- Standardized output
- Special Temperature range

ACCESSORIES

- Instrumentation

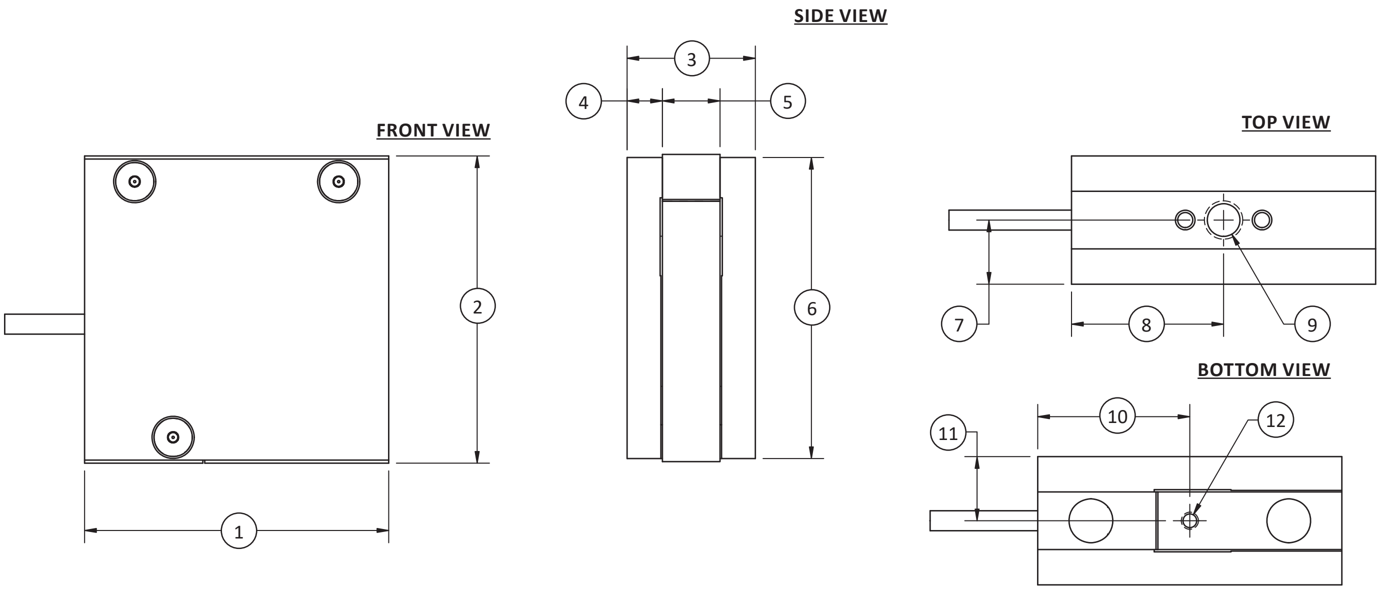
CONNECTOR OPTIONS

- 1.5 m (5 ft) cable

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

FORCE MEASUREMENT SOLUTIONS.

ULC ULTRA LOW CAPACITY LOAD CELL (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITY	
	Metric (N*)	U.S. (lbf)
	0.1, 0.5, 1, 2	0.02, 0.11, 0.22, 0.45
	mm	in
(1)	50.3	1.98
(2)	50.8	2.00
(3)	21.2	0.84
(4)	5.8	0.23
(5)	9.5	0.38
(6)	49.8	1.96
(7)	10.6	0.42
(8)	25.1	0.99
(9)	¼-28 UNF ↧ 8.1	¼-28 UNF ↧ 0.32
(10)	25.1	0.99
(11)	10.6	0.42
(12)	4-40 UNC-2B ↧ 4.8	4-40 UNC-2B ↧ 0.19

***** 1 Newton = 102 gram force**
Note: Other sizes are available – contact factory

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

WMC ROD END LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Proprietary Interface Temperature compensated strain gages
- Environmentally sealed
- Stainless steel construction
- Low deflection
- Tension & Compression

Specifications

CAPACITY	U.S. (lbf)	15K - 50K	100K	200K
	Metric (kN)	65 - 220	450	900
ACCURACY – (MAX ERROR)				
Nonlinearity – %FS		±0.10	±0.15	±0.20
Hysteresis – %FS		±0.10	±0.15	±0.20
Nonrepeatability – %RO		±0.05		
Creep, in 20 min – %		±0.05		
TEMPERATURE				
Compensated Range	°F	+15 to +115		
	°C	-10 to +45		
Operating Range	°F	-65 to +250		
	°C	-54 to +121		
Effect on Output – %	°F	±0.004	±0.005	±0.005
	°C	±0.0072	±0.009	±0.009
Effect on Zero – %RO	°F	±0.0025	±0.005	±0.005
	°C	±0.0045	±0.009	±0.009
ELECTRICAL				
Rated Output – mV/V (Nominal)		2.0		
Zero Balance – %RO		±1.0		
Bridge Resistance – Ohm (Nominal)		350 ±3.5		
Excitation Voltage – VDC MAX		15		
Insulation Resistance – Megohm		> 5000		
MECHANICAL				
Calibration		T & C		
Safe Overload – %CAP		150		
Deflection @ RO	in	0.004		
	mm	0.10		
Weight	lbs	4	14	34.4
	kg	1.8	6.4	15.6
Material		Stainless steel		

STANDARD CONFIGURATION

Model WMC Rod End (Shown)

OPTIONS

- Special calibration
- Standardized output
- Special Temperature range
- CU.S.tom calibration
- Transducer Electronic Data Sheet (TEDS)
- Amplifier

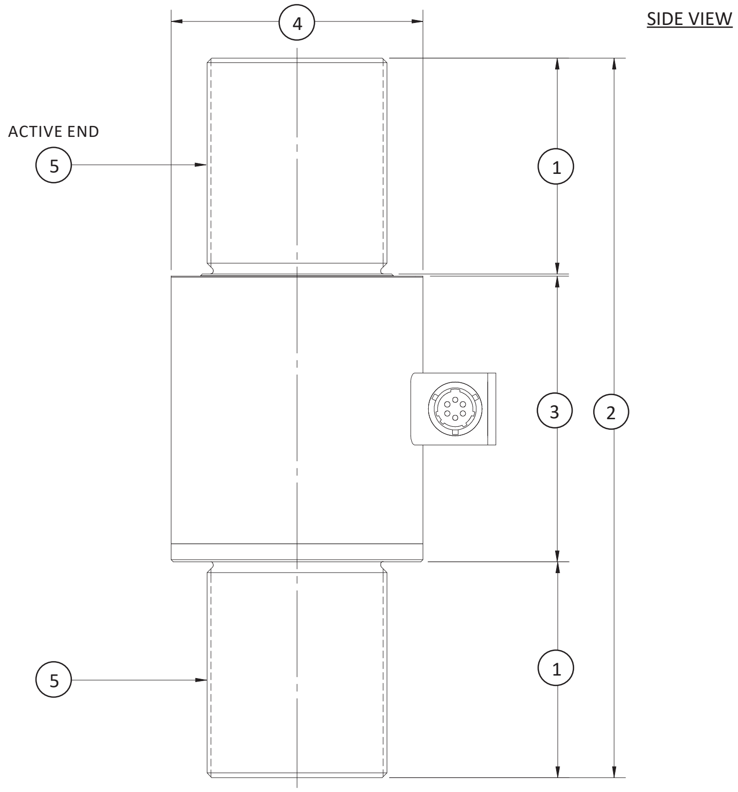
ACCESSORIES

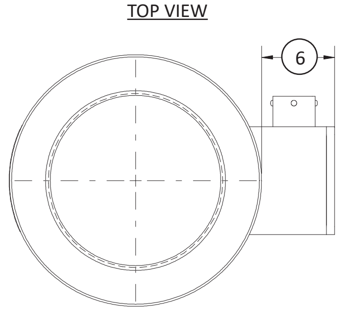
- Instrumentation
- Interconnect cable

CONNECTOR OPTIONS

- Integral cable
- PTWIH-10-6P Connector

WMC ROD END LOAD CELL (U.S. & METRIC)





DIMENSIONS

See Drawing	CAPACITY					
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	15K -50K	65-220	100K	450	200K	900
	in	mm	in	mm	in	mm
(1)	2.00	50.8	3.00	76.20	4.00	101.60
(2)	6.5	165.1	10.00	254.00	13.00	330.20
(3)	2.47	62.7	3.97	100.84	4.97	126.24
(4)	2.5	63.5	3.50	88.90	4.47	113.54
(5)	1.5-12 UNF M36X4		2.50-12 UN M64x4		3.50-8 UN M90x4	
(6)	1.01	25.7	1.28	32.51	1.36	34.54

interface
FORCE MEASUREMENT SOLUTIONS.

WMC MINIATURE SEALED STAINLESS STEEL LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Proprietary Interface Temperature compensated strain gages
- Tension & compression
- Small size
- Environmentally sealed

Specifications

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.15
Hysteresis – %FS		±0.15
Nonrepeatability – %RO		±0.05
Creep, in 20 min – %		±0.05
TEMPERATURE		
Compensated Range	°F	+15 to +115
	°C	-10 to +45
Operating Range	°F	-65 to +250
	°C	-54 to +121
Effect on Output – % / °F MAX		±0.002
Effect on Zero – %RO / °F MAX		±0.005
ELECTRICAL		
Rated Output – mV/V (Nominal)		2.0
Zero Balance – %RO		±2.0
Bridge Resistance – Ohm (Nominal)		350
Excitation Voltage – VDC MAX		12.0
Insulation Resistance – Megohm		> 5000
MECHANICAL		
Calibration		T & C
Safe Overload – %CAP		150
Weight	lbs	0.05 - 0.12
	g	22.7 - 54.4
Material		Stainless steel

OPTIONS

- Cable length
- Special calibration
- Standardized output
- Special Temperature range
- CU.S.tom calibration
- Add connector to cable
- Submersible
- Transducer Electronic Data Sheet (TEDS)

ACCESSORIES

- Instrumentation

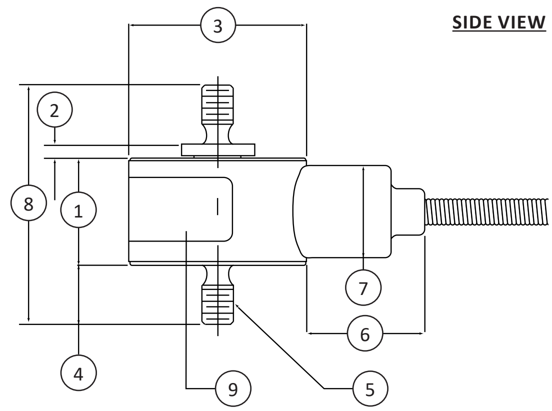
CONNECTOR OPTIONS

- 5 ft (1.5 m) integral cable

STANDARD CONFIGURATION

Model WMC (Shown)

SIDE VIEW



DIMENSIONS

See Drawing	CAPACITY					
	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)	U.S. (lbf)	Metric (N)
	5 - 10	22 - 45	25 - 100	110 - 450	250 - 500	1100 - 2200
	in	mm	in	mm	in	mm
(1)	0.45	11.4	0.52	13.2	0.53	13.4
(2)	0.06	1.5	0.03	0.8	0.03	0.8
(3)	Ø0.75	Ø19.1	Ø1.00	Ø25.4	Ø1.00	Ø25.4
(4)	0.25 TYP	6.4 TYP	0.25 TYP	6.4 TYP	0.38 TYP	9.7 TYP
(5)	6-32 UNC M4X0.7 TYP		10-32 UNF M5X0.8 TYP		¼-28 UNF M6X1 TYP	
(6)	0.50	12.7	0.50	12.7	0.50	12.7
(7)	Ø0.39	Ø9.9	Ø0.39	Ø9.9	Ø0.39	Ø9.9
(8)	1.01	25.7	1.05	26.7	1.32	33.5

DEFLECTION @ RO							
lbf	N	lbf	N	lbf	N	lbf	N
5	22	10	45	25	110	50	220
in	mm	in	mm	in	mm	in	mm
0.0012	0.030	0.0010	0.025	0.0014	0.036	0.0010	0.025

DEFLECTION @ RO (CONTINUED)					
lbf	N	lbf	N	lbf	N
100	450	250	1100	500	2200
in	mm	in	mm	in	mm
0.0007	0.018	0.0026	0.066	0.0025	0.064

WMC MINIATURE SEALED STAINLESS STEEL LOAD CELL (U.S. & METRIC)

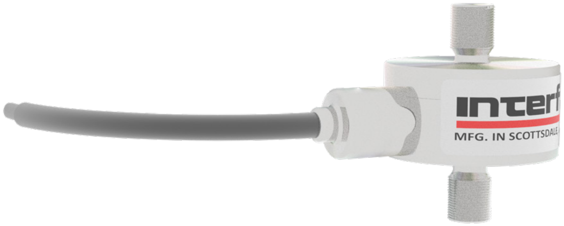
FEATURES & BENEFITS

- Capacities 1k - 10k lbf (4500 - 45000 N)
- Proprietary Interface Temperature compensated strain gages
- Tension & compression
- Small size
- Environmentally sealed

Specifications

ACCURACY – (MAX ERROR)			
Nonlinearity – %FS			±0.20
Hysteresis – %FS			±0.20
Nonrepeatability – %RO			±0.05
Creep, in 20 min – %			±0.05
TEMPERATURE			
Compensated Range		°F	+15 to +115
		°C	-10 to +45
Operating Range		°F	-65 to +250
		°C	-54 to +121
Effect on Output – % / °F MAX			±0.002
Effect on Zero – %RO / °F MAX			±0.005
ELECTRICAL			
Rated Output – mV/V (Nominal)			2.0
Zero Balance – %RO			±2.0
Bridge Resistance – Ohm (Nominal)			350
Excitation Voltage – VDC MAX			15.0
Insulation Resistance – Megohm			> 5000
MECHANICAL			
Calibration			T & C
Deflection @ RO	1K (lbf)	in	0.0022
	4.5 (kN)	mm	0.056
	2K, 3K (lbf)	in	0.0020
	9.13 (kN)	mm	0.051
	5K (lbf)	in	0.0017
	22 (kN)	mm	0.043
	7.5K, 10K (lbf)	in	0.0016
	33 (kN)	mm	0.041
	10K (lbf)	in	0.0015
	45 (kN)	mm	0.038
Safe Overload – % CAP			150
Weight		lbs	0.13 - 0.50
		g	59.0 - 226.8
Material			Stainless steel

STANDARD CONFIGURATION



Model WMC (Shown)

OPTIONS

- Cable length
- CU.S.tom calibration
- Standardized output
- Add connector to cable
- Transducer Electronic Data Sheet (TEDS)
- Standardized output
- Submersible
- Special Temperature range

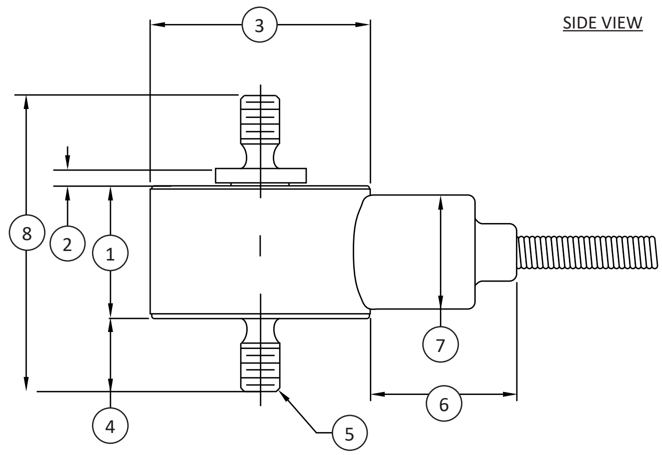
ACCESSORIES

- Instrumentation

CONNECTOR OPTIONS

- 5 ft. (1.5m) integral cable

WMC MINIATURE SEALED STAINLESS STEEL LOAD CELL (U.S. & METRIC)



Dimensions

See Drawing	CAPACITY							
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	1K	4.5	2K, 3K	9, 13	5K	22	7.5K, 10K	33, 45
	in	mm	in	mm	in	mm	in	mm
(1)	0.53	13.4	0.72	18.3	0.94	23.9	1.09	27.7
(2)	0.03	0.8	0.03	0.8	0.03	0.8	0.03	0.8
(3)	Ø1.00	Ø25.4	Ø1.00	Ø25.4	Ø1.25	Ø31.8	Ø1.38	Ø34.9
(4)	0.38 TYP	9.7 TYP	0.50 TYP	12.7 TYP	0.63 TYP	16.0 TYP	0.88 TYP	22.4 TYP
(5)	¼-28 UNF	M6x1 TYP	⅜-24 UNF	M10x1.5 TYP	0.500-20 UNF	M12x1.75 TYP	0.750-16 UNF	M16x2 TYP
(6)	0.50	12.7	0.50	12.7	0.50	12.7	0.50	12.7
(7)	Ø0.39	Ø9.9	Ø0.39	Ø9.9	Ø0.39	Ø9.9	Ø0.39	Ø9.9
(8)	1.32	33.5	1.75	44.5	2.23	56.6	2.88	73.2

WMCFP MINIATURE SEALED STAINLESS STEEL LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 500 to 1000 gf (1.10 to 2.20 lbf)
- Proprietary Interface Temperature compensated strain gages
- Tension and compression
- Environmentally sealed
- Overload protected to 8x capacity

Specifications

Capacities	Metric (gf)	500	1000
	U.S. (lbf)	1.10	2.20
ACCURACY – (MAX ERROR)			
Nonlinearity – %FS		±0.20	
Hysteresis – %FS		±0.20	
Nonrepeatability – %RO		±0.05	
Creep, in 20 min – %		±0.05	
TEMPERATURE			
Compensated Range	°C	-10 to +45	
	°F	+15 to +115	
Operating Range	°C	-54 to +121	
	°F	-65 to +250	
Effect on Output – % / °F MAX		±0.002	
Effect on Zero – %RO / °F MAX		±0.005	
ELECTRICAL			
Rated Output – mV/V (Nominal)		1.0	
Zero Balance – %RO		±2.0	
Bridge Resistance – Ohm (Nominal)		350	
Excitation Voltage – VDC MAX		7	
Insulation Resistance – Megohm		> 5000	
MECHANICAL			
Calibration		Tension	
Safe Overload – %CAP		800	
Deflection @RO	mm	0.013	0.003
	in	0.005	0.001
Weight	kg	0.09	
	lbs	0.2	
Material		Stainless steel	

OPTIONS

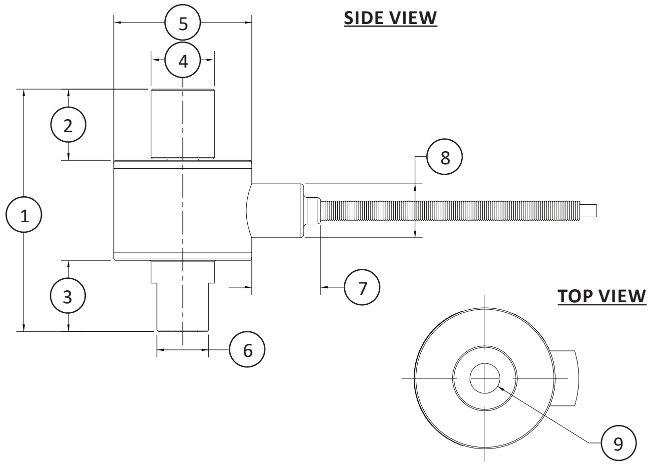
- Cable length
- Special calibration
- Standardized output
- Special Temperature range
- CU.S.tom calibration
- Add connector to cable
- Transducer Electronic Data Sheet (TEDS)

ACCESSORIES

- Instrumentation

STANDARD CONFIGURATION

Model WMCFP (Shown)



DIMENSIONS

See Drawing	CAPACITY	
	Metric (gf)	**U.S. (lbf)**
	500, 1000	**1.10, 2.20**
	mm	**in**
(1)	44.5	1.75
(2)	13.2	0.52
(3)	13.2	0.52
(4)	Ø11.7	Ø0.46
(5)	Ø25.4	Ø1.00
(6)	Ø9.5	Ø0.38
(7)	12.7	0.50
(8)	9.9	0.39
(9)	0.250-28 UNF ↧ 0.32	

CONNECTOR OPTIONS

- 1.5 m (5 ft) integral cable

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

WMCP STAINLESS STEEL LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 500 to 1000 gf (1.1 to 2.2 lbf)
- Proprietary Interface Temperature compensated in gages
- Tension and compression
- Small size
- Environmentally sealed
- Overload protected to 8x capacity

Specifications

CAPACITY	Metric (gf)	500	1000
	U.S. (lbf)	1.1	2.2
ACCURACY – (MAX ERROR)			
Nonlinearity – %FS		±0.15	
Hysteresis – %FS		±0.15	
Nonrepeatability – %RO		±0.15	±0.1
Creep, in 20 min – %		±0.1	±0.05
TEMPERATURE			
Compensated Range	°C	+10 to +66	
	°F	+50 to +150	
Operating Range	°C	-54 to +121	
	°F	-65 to -250	
Effect on Output – % / °F		±0.20	
Effect on Zero – %RO / °F MAX		±2.00	±1.00
ELECTRICAL			
Rated Output – mV/V (Nominal)		0.75 (±0.15)	1.50 (±0.30)
Zero Balance – %RO		±2.0	
Bridge Resistance – Ohm (Nominal)		350 (±3.5)	
Excitation Voltage – VDC or VAC MAX		7	
Insulation Resistance – Megohm		5000	
MECHANICAL			
Calibration		Tension	
Safe Overload – %CAP		1600	800
Deflection @RO	mm	0.127	0.254
	in	0.005	0.010
Weight	kg	0.08	
	lbs	0.18	
Material		Stainless steel	

OPTIONS

- Special calibration
- Standard output
- Special Temperature range
- CU.S.tom calibration
- Add connector to cable
- Transducer Electronic Data Sheet (TEDS)

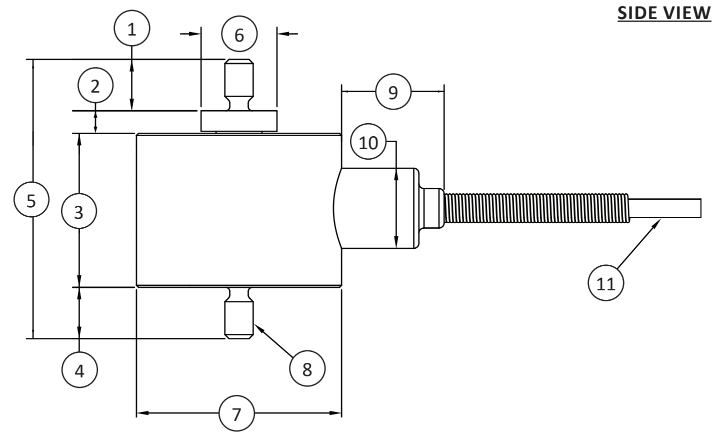
ACCESSORIES

- Instrumentation

STANDARD CONFIGURATION

Model WMCP - 1000G (Shown)

SIDE VIEW



Dimensions

See Drawing	CAPACITY	
	Metric (gf)	**U.S. (lbf)**
	500, 1000	**1.1, 2.2**
	mm	**in**
(1)	6.4	0.25
(2)	2.8	0.11
(3)	19.1	0.75
(4)	6.4	0.25
(5)	34.5	1.36
(6)	Ø9.4	Ø0.37
(7)	Ø25.4	Ø1.00
(8)	#6-32 UNC-3A (Both Ends)	
(9)	12.7	0.50
(10)	Ø9.9	Ø0.39
(11)	Ø2.3	Ø0.09

CONNECTOR OPTIONS

- 1.5 m (5 ft) integral cable

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

Notes:

Notes:

Torque Transducers

Wireless Rotary

Reaction

Flange Style

Rotary

5330 HOLLOW FLANGE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- High torsional stiffness
- ExtraneoU.S. load resistance
- Compact size
- Large thru-hole

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.1
Hysteresis – %FS		±0.25
Nonrepeatability – %RO		±0.05
TEMPERATURE		
Effect on Output – % / °F – MAX		±0.002
Effect on Zero – %RO / °F – MAX		±0.002
Compensated Range	°F	+75 to +175
	°C	+24 to +80
Operating Range	°F	-65 to +225
	°C	-54 to +107
ELECTRICAL		
Rated Output – mV/V (Nominal)	60 - 6K lbf-in	1.0
	6.78 - 678 Nm	
	10K - 100K lbf-in	2.0
	1.13K - 11.3K Nm	
Bridge Resistance – Ohm (Nominal)	60 - 1.2K lbf-in	350
	6.78 - 136 Nm	
	3K - 100K lbf-in	700
	339 - 11.3K Nm	
Excitation Voltage – VDC MAX		10
MECHANICAL		
Calibration		CW & CCW
Safe Overload – %CAP		200
Material	60 - 120 lbf-in	Aluminum
	6.78 - 13.6 Nm	
	240 - 100K lbf-in	Stainless steel
	27.1 - 11.3K Nm	

STANDARD CONFIGURATION

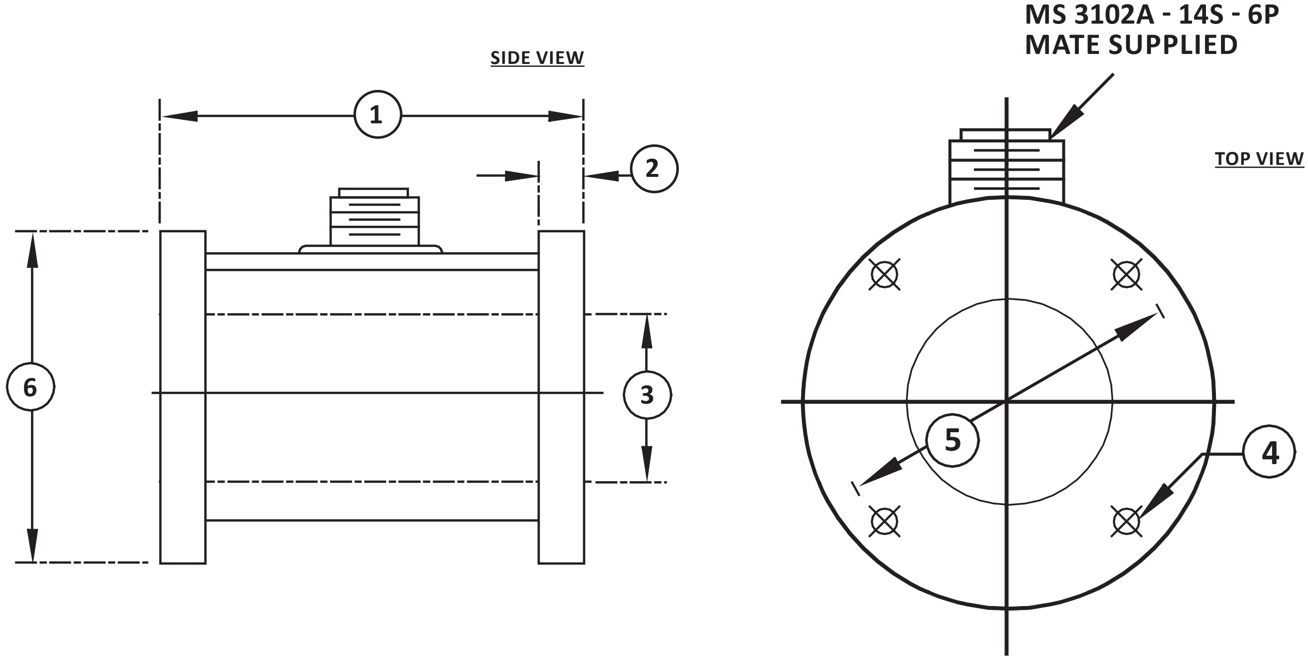
MODEL 5330 (Shown)

PERFORMANCE PARAMETERS

CAPACITY		MAX THRU.S.T LOAD		MAX BENDING MOMENT	
lbf-in	Nm	lbf	N	lbf-in	Nm
60	6.78	100	445	50	5.65
120	13.6	120	534	60	6.78
240	27.1	240	1.07K	120	13.6
600	67.8	600	2.67K	300	33.9
1.2K	136	1.2K	5.34K	600	67.8
3K	339	3K	13.3K	1.5K	169
6K	678	6K	26.7K	3K	339
10K	1.13K	2.5K	11.1K	2.25K	254
20K	2.26K	5K	22.2K	4.5K	508
50K	5.65K	10K	44.5K	10K	1.13K
100K	11.3K	20K	89K	20K	2.26K

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

5330 HOLLOW FLANGE REACTION TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITY									
	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)
	60, 120, 240	6.78, 13.6, 17.1	600, 1200	67.8, 136	3K, 6K	339, 678	10K, 20K	1.13K, 2.26K	50K, 100K	5.65K, 11.3K
	in	mm	in	mm	in	mm	in	mm	in	mm
(1)	2.125	53.98	2.125	53.98	2.125	53.98	3.5	88.9	3.5	88.9
(2)	0.3125	7.938	0.3125	7.938	0.3125	7.938	0.625	15.88	0.625	15.88
(3)	0.875 THRU	22.23 THRU	1.375 THRU	34.93 THRU	2.375 THRU	60.33 THRU	3.375 THRU	85.73 THRU	3.375 THRU	85.73 THRU
(4)	0.203 THRU 2 places	5.16 THRU 2 places	0.39 THRU 2 places	9.9 THRU 2 places	0.406 THRU 4 places	10.31 THRU 4 places	3/8 - 24 UNF 6 places		0.63 THRU 8 places	16.0 THRU 8 places
(5)	2.0	50.8	2.5	63.5	3.375	85.73	4.375	111.13	7.00	177.8
(6)	2.5	63.5	3.25	82.6	4.0	101.6	5.0	127.0	8.5	215.9

Notes:
– Error due to bending <1% FS at maximum allowable bending load.
– Allowable loads cannot be applied simultaneoU.S.ly

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

5350 SOLID FLANGE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Threaded mounting holes
- Compact size
- Optional ±10 VDC output available on 100 ozf-in and above

SPECIFICATIONS

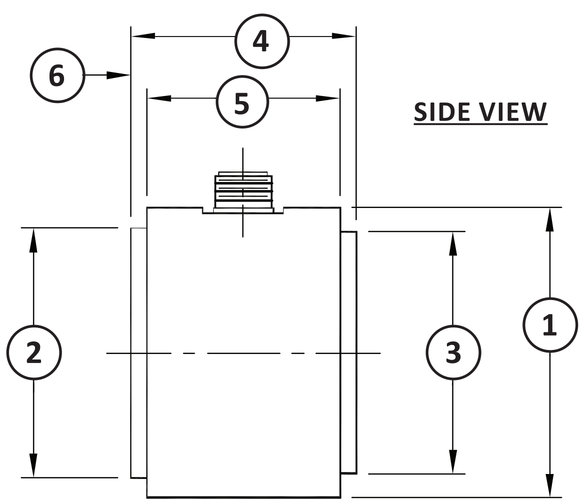
ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		± 0.1
Hysteresis – %FS		± 0.1
Nonrepeatability – %RO		± 0.05
TEMPERATURE		
Compensated Range	°F	+75 to +175
	°C	+24 to +80
Operating Range	°F	-65 to +225
	°C	-54 to +107
Effect on Output – % / °F MAX		±0.002
Effect on Zero – %RO / °F MAX		±0.002
ELECTRICAL		
Rated Output – mV/V (Nominal)	10 ozf-in	2.0
	0.07 Nm	1.3
Bridge Resistance – Ohm (Nominal)		350
Excitation Voltage – VDC MAX		10
MECHANICAL		
Calibration		CW & CCW
Safe Overload – %CAP		200
Material		Aluminum

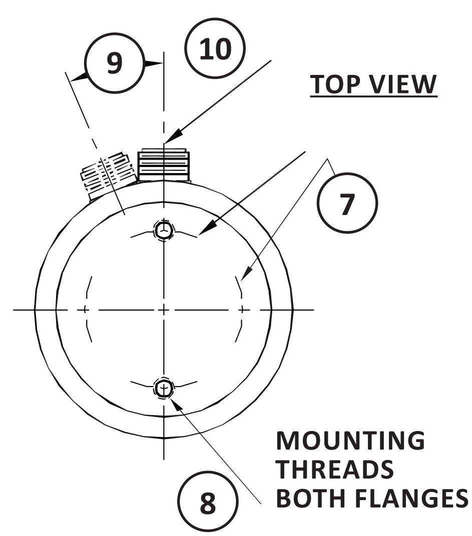
STANDARD CONFIGURATION

MODEL 5350 (Shown)

DIMENSIONS

See Drawing	CAPACITY	
	U.S. (ozf-in)	Metric (Nm)
	10, 20, 50, 100, 200	0.07, 0.14, 0.35, 0.71, 1.41
	in	mm
(1)	Ø1.50	Ø38.1
(2)	Ø1.00	Ø25.4
(3)	Ø0.875	Ø22.225
(4)	1.50	38.1
(5)	1.375	34.925
(6)	0.0625	1.5875
(7)	Ø0.563	Ø14.3002
(8)	#4-40 UNC-2B 2 places	
(9)	0°	
(10)	Conxall 7282-6PG-300	





* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

FORCE MEASUREMENT SOLUTIONS.

5350 SOLID FLANGE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

PERFORMANCE PARAMETERS

CAPACITY		TORQUE OVERLOAD		TORSIONAL STIFFNESS (FROM FLANGE FACE-TO-FACE)		WEIGHT		MAX THRU.S.T LOAD		MAX BENDING MOMENT		MAX SHEAR LOAD	
lbf-in	Nm	lbf-in	Nm	lbf-in/rad	Nm/rad	lbs	kg	lbf	N	lbf-in	Nm	lbf	N
10	1.13	20	2.26	650	73.5	0.5	0.2	40	178	10	1.13	10	44.5
20	2.26	40	4.52	1.8K	203			80	356	20	2.26	20	89
50	5.65	100	11.3	7.4K	836			200	890	50	5.65	50	222
100	11.3	200	22.6	13.4K	1.51K	1.2	0.5	100	445	50	5.65	50	222
200	22.6	400	45.2	37.5K	4.24K			200	890	100	11.3	100	445

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

FORCE MEASUREMENT SOLUTIONS.

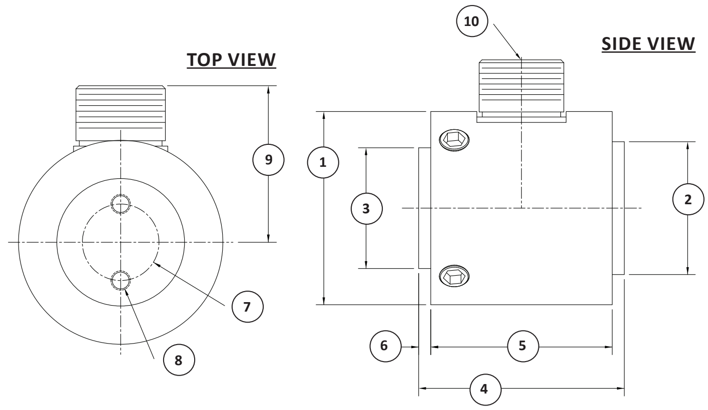
5355 SOLID FLANGE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Threaded mounting holes
- Compact size
- Optional ±10 VDC output available on 100 ozf-in (0.71 Nm) and above

STANDARD CONFIGURATION

Model 5355 (Shown)



SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		± 0.1
Hysteresis – %FS		± 0.1
Nonrepeatability – %RO		± 0.05
TEMPERATURE		
Compensated Range	°F	+75 to +175
	°C	+24 to +80
Operating Range	°F	-65 to +225
	°C	-54 to +107
Effect on Output – % / °F MAX		±0.002
Effect on Zero – %RO / °F MAX		±0.002
ELECTRICAL		
Rated Output – mV/V (Nominal)	10 ozf-in	2.0
	0.07 Nm	1.3
Bridge Resistance – Ohm (Nominal)		350
Excitation Voltage – VDC MAX		10
MECHANICAL		
Calibration		CW & CCW
Safe Overload – %CAP		200
Material	10 - 500 lbf-in	Aluminum
	1K - 100K lbf-in	Stainless steel

DIMENSIONS

See Drawing	CAPACITY									
	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)
	20, 50	2.26, 5.65	100, 200, 500	11.3, 22.6, 56.5	1K, 2K, 5K	113, 226, 565	10K, 20K	1.13K, 2.26K	50K, 100K	5.65K, 11.3K
	in	mm	in	mm	in	mm	in	mm	in	mm
(1)	2.00	50.8	2.75	69.85	4.50	114.3	6.00	152.4	8.00	203.2
(2)	1.375	34.93	2.000	50.8	3.875	98.43	5.375	136.5	7.375	187.3
(3)	1.250	31.75	1.875	47.63	3.750	95.25	5.25	133.4	7.250	184.2
(4)	2.125	53.98	2.75	69.85	3.50	88.9	4.50	114.3	5.50	139.7
(5)	1.875	47.63	2.375	60.33	3.00	76.2	3.75	95.25	4.75	120.7
(6)	0.125	3.175	0.188	4.775	0.25	6.35	0.375	9.525	0.375	9.525
(7)	0.750	19.05	1.250	31.75	2.750	69.85	4.000	101.6	5.750	146.1
(8)	#10-32 UNF-2B – 2 places		¼-20 UNC-2B – 4 places		⅜-24 UNF-2B – 4 places		7/16-20 UNF-2B – 8 places		⅝-18 UNF-2B – 12 places	
	↧0.25	↧6.4	↧0.38	↧9.7	↧0.50	↧12.7	↧0.62	↧15.7	↧0.75	↧19.1
(9)	1.563	39.7	1.938	49.2	2.813	71.4	3.625	92.1	4.656	118.3
(10)	MS3102A-14S-6P		MS3102A-14S-6P		MS3102A-14S-6P		MS3102A-14S-6P		MS3102A-14S-6P	

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5355 SOLID FLANGE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

PERFORMANCE PARAMETERS

CAPACITY		TORQUE OVERLOAD		TORSIONAL STIFFNESS (FROM FLANGE FACE-TO-FACE)		WEIGHT		MAX THRU.S.T LOAD		MAX BENDING TORQUE		MAX SHEAR LOAD	
lbf-in	Nm	lbf-in	Nm	lbf-in/rad	Nm/rad	lbs	kg	lbf	N	lbf-in	Nm	lbf	N
20	2.26	40	4.52	1.8K	203	0.5	0.2	80	356	20	2.26	20	89
50	5.65	100	11.3	7.4K	836			200	890	50	5.65	50	222
100	11.3	200	22.6	13.4K	1,510	1.2	0.5	100	445	50	5.65	50	222
200	22.6	400	45.2	37.5K	4,240			200	890	100	11.3	100	445
500	56.5	1K	113	145K	16.4K			500	2.24K	250	28.2K	250	1.11K
1K	113	2K	226	270K	30.5K	8	4	1K	4.45K	500	56.5	500	2.24K
2K	226	4K	452	775K	87.6K			2K	8.9K	1K	113	1K	4.45K
5K	565	10K	1.13K	3000K	339K			5K	22.2K	2.5K	282	2.5K	11.1K
10K	1.13K	20K	2.26K	2000K	226K	20	9	10K	44.5K	5K	565	5K	22.2K
20K	2.26K	40K	4.52K	5000K	565K			20K	89K	10K	1.13K	10K	44.5K
50K	5.65K	100K	11.3K	13000K	1470K	41	19	50K	222K	25K	2.82K	25K	111K
100K	11.3K	200K	22.6K	33000K	3730K	42	19	100K	445K	50K	5.65K	50K	222K

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

5400 SOLID FLANGE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 1K to 500K lbf-in (110 to 55K Nm)
- High torsional stiffness
- Flange mount
- Low deflection
- Metric models have mounting holes sized for Metric fasteners

STANDARD CONFIGURATION

MODEL 5400 (Shown)

Specifications

PARAMETERS	5410 U.S. (lbf-in)	5410 Metric (Nm)	5411 U.S. (lbf-in)	5411 Metric (Nm)	5412 U.S. (lbf-in)	5412 Metric (Nm)	5413 U.S. (lbf-in)	5413 Metric (Nm)	5414 U.S. (lbf-in)	5414 Metric (Nm)
CAPACITY	1K, 2K, 5K	110, 220, 550	10K, 20K	1.1K, 2.2K	50K, 100K	5.5K, 11K	200K	22K	300K, 500K	33K, 55K

PARAMETERS		5410	5411	5412	5413	5414
ACCURACY – (MAX ERROR)						
Nonlinearity – %FS		±0.1	±0.1	±0.1	±0.1	±0.1
Combined Error – %FS		±0.1	±0.1	±0.1	±0.1	±0.1
Nonrepeatability – %RO		±0.02	±0.02	±0.02	±0.02	±0.02
TEMPERATURE						
Compensated Range	°F	+70 to +170	+70 to +170	+70 to +170	+70 to +170	+70 to +170
	°C	+21 to +77	+21 to +77	+21 to +77	+21 to +77	+21 to +77
Operating Range	°F	-65 to +200	-65 to +200	-65 to +200	-65 to +200	-65 to +200
	°C	-54 to +93	-54 to +93	-54 to +93	-54 to +93	-54 to +93
Effect on Zero – %RO MAX	°F	±0.002	±0.002	±0.002	±0.002	±0.002
	°C	±0.004	±0.004	±0.004	±0.004	±0.004
Effect on Output – % MAX	°F	±0.002	±0.002	±0.002	±0.002	±0.002
	°C	±0.004	±0.004	±0.004	±0.004	±0.004
ELECTRICAL						
Rated Output – mV/V (Nominal)		2.0	2.0	2.0	2.0	2.0
Excitation Voltage – VDC MAX		20	20	20	20	20
Bridge Resistance – Ohm (Nominal)		350	350	350	350	350
Electrical Connection		MS3102E-14S-5P	MS3102E-14S-5P	MS3102E-14S-5P	MS3102E-14S-5P	MS3102E-14S-5P
MECHANICAL						
Safe Overload – %CAP		±150	±150	±150	±150	±150
Deflection at Capacity – rad		0.005	0.004	0.006, 0.005	0.006	0.005
Overhung Moment MAX	U.S. (lbf-in)	500, 1K, 2K	5K, 10K	24K, 50K	90K	150K, 200K
	Metric (Nm)	56.5, 110, 220	550, 1.1K	2.71K, 5.65K	10.2K	16.9K, 22.6K
Side Load – MAX	U.S. (lbf)	1K, 1.5K, 2K	4K, 6.5K	12K, 20K	30K	42K, 55K
	Metric (kN)	4.45, 6.67, 8.9	17.8, 28.9	53.4, 89	133	187, 245
Axial Load – MAX	U.S. (lbf)	1.5K, 2K, 3K	6K, 10K	18K, 30K	40K	60K, 80K
	Metric (kN)	6.67, 8.9, 13.3	26.7, 44.5	80.1, 133	178	267, 356
Material		Alloy steel	Alloy steel	Alloy steel	Alloy steel	Alloy steel

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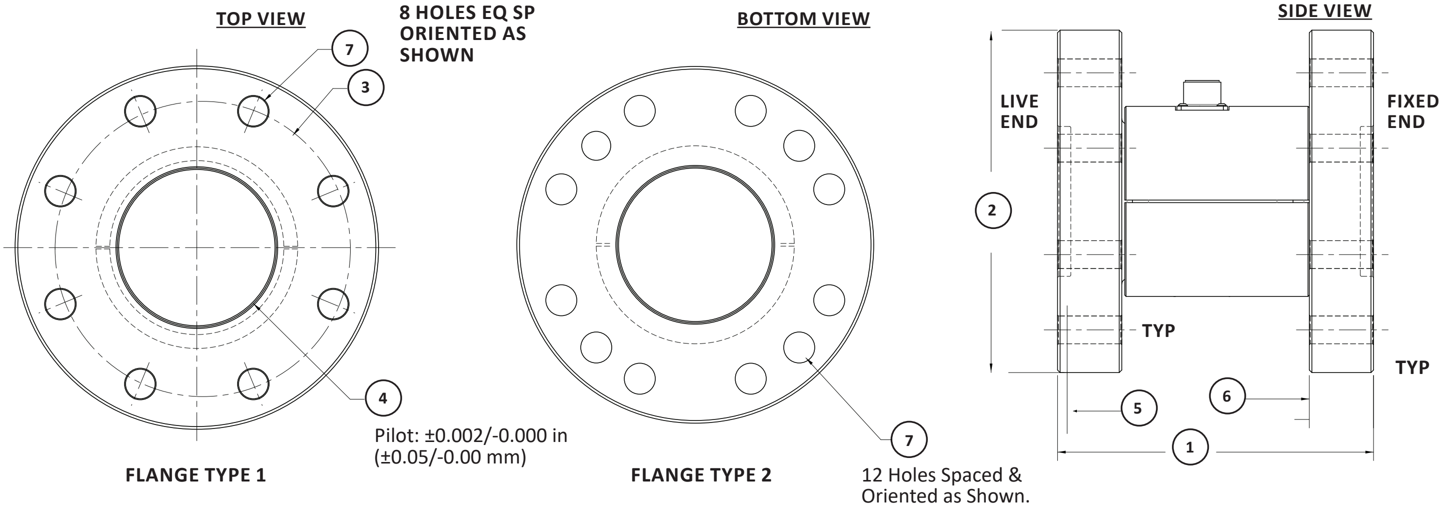
FORCE MEASUREMENT SOLUTIONS.

5400 SOLID FLANGE REACTION TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

SEE DRAWING	MODEL											
	5410		5411		5412				5413		5414	
	CAPACITY											
	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)		Metric (Nm)		U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)
	1K, 2K, 5K	110, 220, 550	10K, 20K	1.1K, 2.2K	50K	100K	5.5K	11K	200K	22K	300K, 500K	33K, 55K
	in	mm	in	mm	in		mm		in	mm	in	mm
(1)	3.00	76.2	3.50	88.9	7.38		187.5		8.50	215.9	10.50	266.7
(2)	4.00	101.6	5.00	127.0	8.00		203.2		9.75	247.7	14.00	355.6
(3)	3.25	82.6	4.25	108.0	6.50		165.1		8.00	203.2	11.0	279.4
(4)	1.500	38.10	2.000	50.80	3.500		88.90		4.000	101.60	6.000	152.40
(5)	0.13	3.3	0.25	6.4	0.31		7.9		0.31	7.9	0.31	7.9
(6)	0.50	12.7	0.75	19.1	1.50		38.1		1.50	38.1	2.00	50.8
(7)	0.328	8.33	0.390	10.41*	0.650		16.51		0.781*	20.65	1.031	24.64*
Flange Type	1	1	1	1	1	2	1	2	2	2	1	1
Recommended mtg screw size – lbf-in/Nm	5⁄16 - 24	M8 x 1.25	3⁄8 - 24	M10 x 1.5	5⁄8 - 18		M16 x 2		3⁄4 - 16	M20 x 2.5	1 - 12	M24 x 3
Recommended mtg torque – lbf-in/Nm	300	34	600	68	2400		270		4400	500	9000	1000

**** Metric Model 5411, 5413, & 5414 have larger mounting holes than their equivalents to accommodate Standard Metric***

** Metric Model 5411, 5413 & 5414 have larger mounting holes than their equivalents to accomodate Standard Metric fasteners*

5500 CALIBRATION GRADE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

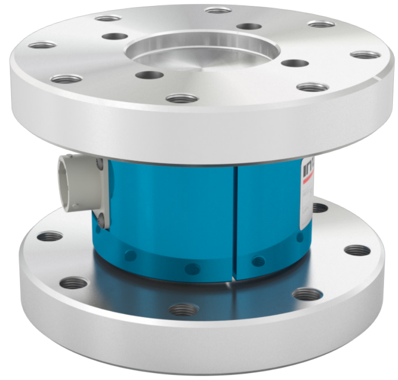
FEATURES & BENEFITS

- Capacities from 2K to 300K lbf-in (220 to 33K Nm)
- High torsional stiffness
- Flange to flange mounting
- Low deflection
- Low overhang moment sensitivity
- Low axial force sensitivity

OPTIONS

- ASTM E2428 Calibration (Some limitations apply, consult factory)
- Mating connector
- Mating cable

STANDARD CONFIGURATION

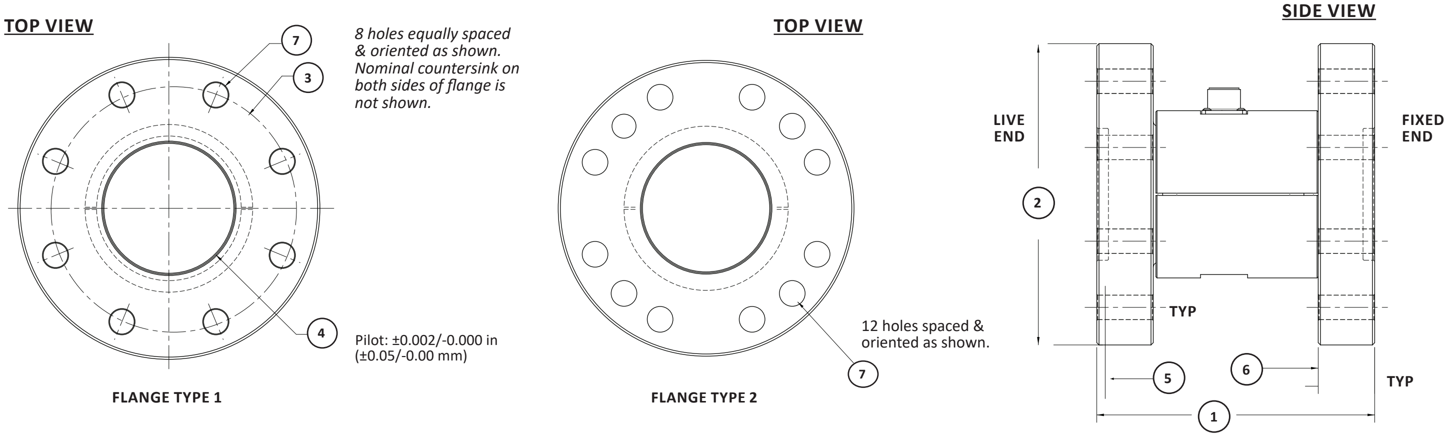


MODEL 5500 (Shown)

Specifications

PARAMETERS		MODEL 5510	MODEL 5511	MODEL 5512	MODEL 5513	MODEL 5514
CAPACITY	U.S. (lbf-in)	2K, 5K	10K, 20K	50K, 100K	200K	300K
	Metric (Nm)	220, 550	1.1K, 2.2K	5.5K, 11K	22K	33K
ACCURACY – (MAX ERROR)						
Nonlinearity – %FS		±0.05	±0.05	±0.05	±0.05	±0.05
Hysteresis – %FS		±0.04	±0.04	±0.04	±0.04	±0.04
Nonrepeatability – %RO		±0.01	±0.01	±0.01	±0.01	±0.01
TEMPERATURE						
Compensated Range	°F	+50 to +150	+50 to +150	+50 to +150	+50 to +150	+50 to +150
	°C	+10 to +65	+10 to +65	+10 to +65	+10 to +65	+10 to +65
Operating Range	°F	-65 to +200	-65 to +200	-65 to +200	-65 to +200	-65 to +200
	°C	-54 to +93	-54 to +93	-54 to +93	-54 to +93	-54 to +93
Effect on Zero – %RO MAX	°F	±0.0008	±0.0008	±0.0008	±0.0008	±0.0008
	°C	±0.0015	±0.0015	±0.0015	±0.0015	±0.0015
Effect on Output – % MAX	°F	±0.001	±0.001	±0.001	±0.001	±0.001
	°C	±0.002	±0.002	±0.002	±0.002	±0.002
ELECTRICAL						
Rated Output – mV/V (Nominal)		2.0	2.0	2.0	2.0	2.0
Excitation Voltage – VDC MAX		20	20	20	20	20
Bridge Resistance – Ohm (Nominal)		700	700	700	700	700
Electrical Connection		PT02E-12-8P	PT02E-12-8P	PT02E-12-8P	PT02E-12-8P	PT02E-12-8P
MECHANICAL						
Safe Overload – %CAP		±150	±150	±150	±150	±150
Deflection at Capacity – rad		0.005	0.004	0.006, 0.005	0.006	0.005
Overhung Moment MAX	U.S. (lbf-in)	1K, 2K	5K, 10K	24K, 50K	90K	150K
	Metric (Nm)	113, 226	565, 1.13K	2.71K, 5.65K	10.2K	16.9K
Side load MAX	U.S. (lbf)	1.5K, 2K	4K, 6.5K	12K, 20K	30K	42K
	Metric (kN)	6.67, 8.9	17.8, 28.9	53.4, 89	133	187
Axial load MAX	U.S. (lbf)	2K, 3K	6K, 10K	18K, 30K	40K	60K
	Metric (kN)	8.9	26.7, 44.5	80.1, 133	178	267
Material		Alloy steel	Alloy steel	Alloy steel	Alloy steel	Alloy steel

5500 CALIBRATION GRADE REACTION TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

<table>
<tr><th rowspan="6">CAPACITY</th><th colspan="12">MODEL</th></tr>
<tr><th colspan="2">5510</th><th colspan="2">5511</th><th colspan="4">5512</th><th colspan="2">5513</th><th colspan="2">5514</th></tr>
<tr><th colspan="12">CAPACITY</th></tr>
<tr><th>U.S. (lbf-in)</th><th>Metric (Nm)</th><th>U.S. (lbf-in)</th><th>Metric (Nm)</th><th colspan="2">U.S. (lbf-in)</th><th colspan="2">Metric (Nm)</th><th>U.S. (lbf-in)</th><th>Metric (Nm)</th><th>U.S. (lbf-in)</th><th>Metric (Nm)</th></tr>
<tr><th>2K, 5K</th><th>220, 550</th><th>10K, 20K</th><th>1.1K, 2.2K</th><th>50K</th><th>100K</th><th>5.5K</th><th>11K</th><th>200K</th><th>22K</th><th>300K</th><th>33K</th></tr>
<tr><th>in</th><th>mm</th><th>in</th><th>mm</th><th colspan="2">in</th><th colspan="2">mm</th><th>in</th><th>mm</th><th>in</th><th>mm</th></tr>
<tr><td>(1)</td><td>3.00</td><td>76.2</td><td>3.50</td><td>88.9</td><td colspan="2">7.38</td><td colspan="2">187.5</td><td>8.50</td><td>215.9</td><td>10.50</td><td>266.7</td></tr>
<tr><td>(2)</td><td>4.00</td><td>101.6</td><td>5.00</td><td>127.0</td><td colspan="2">8.00</td><td colspan="2">203.2</td><td>9.75</td><td>247.7</td><td>14.00</td><td>355.6</td></tr>
<tr><td>(3)</td><td>3.25</td><td>82.6</td><td>4.25</td><td>108.0</td><td colspan="2">6.50</td><td colspan="2">165.1</td><td>8.00</td><td>203.2</td><td>11.0</td><td>279.4</td></tr>
<tr><td>(4)</td><td>1.50</td><td>38.1</td><td>2.00</td><td>50.8</td><td colspan="2">3.500</td><td colspan="2">88.90</td><td>4.00</td><td>101.60</td><td>6.00</td><td>152.4</td></tr>
<tr><td>(5)</td><td>0.13</td><td>3.3</td><td>0.25</td><td>6.4</td><td colspan="2">0.31</td><td colspan="2">7.9</td><td>0.31</td><td>7.9</td><td>0.31</td><td>7.9</td></tr>
<tr><td>(6)</td><td>0.50</td><td>12.7</td><td>0.75</td><td>19.1</td><td colspan="2">1.50</td><td colspan="2">38.1</td><td>1.50</td><td>38.1</td><td>2.00</td><td>50.8</td></tr>
<tr><td>(7)</td><td>0.328</td><td>8.33</td><td>0.39</td><td>10.41</td><td colspan="2">0.65</td><td colspan="2">16.51</td><td>0.781</td><td>20.65</td><td>1.031</td><td>24.64</td></tr>
<tr><td>Flange Type</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>2</td><td>1</td><td>2</td><td>2</td><td>2</td><td>1</td><td>1</td></tr>
<tr><td>Recommended mtg screw size – lbf-in/Nm</td><td>5/16 - 24</td><td>M8 x 1.25</td><td>3/8 - 24</td><td>M10 x 1.5</td><td colspan="2">5/8 - 18</td><td colspan="2">M16 x 2</td><td>3/4 - 16</td><td>M20 x 2.5</td><td>1 - 12</td><td>M24 x 3</td></tr>
<tr><td>Recommended mtg torque – lbf-in/Nm</td><td>300</td><td>34</td><td>600</td><td>68</td><td colspan="2">2400</td><td colspan="2">270</td><td>4400</td><td>500</td><td>9000</td><td>1000</td></tr>
</table>

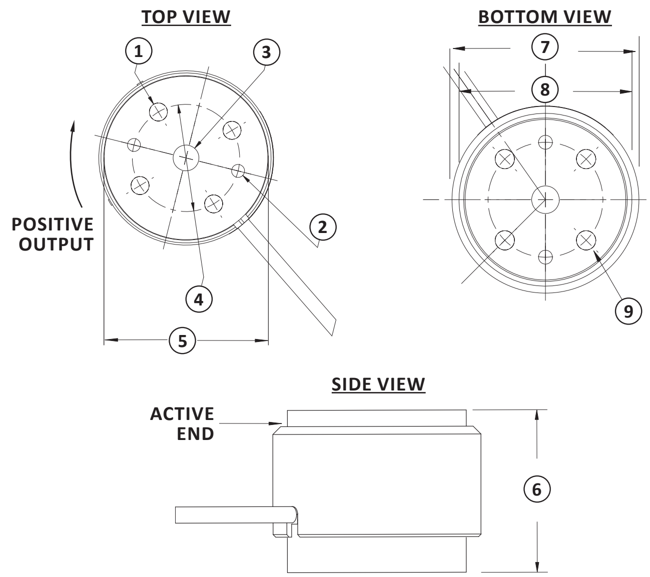
MRT MINIATURE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Low capacity – 0.2 to 20 Nm (1.77 to 177 lbf-in)
- Proprietary Interface Temperature compensated strain gages
- Small size – 41 x 33 mm (1.6 in OD x 1.25 in)
- Excellent linearity & repeatability
- Low deflection – high torsional stiffness

STANDARD CONFIGURATION

MODEL MRT (Shown)



SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		± 0.10
Hysteresis – %FS		± 0.10
Nonrepeatability – %RO		± 0.05
Creep, in 20 min – %		± 0.10
TEMPERATURE		
Effect on Zero – %RO / 100F°		±0.20
Effect on Output – % / 100F°		±0.10
Compensated Range	°C	-10 to +45
	°F	+15 to +115
Operating Range	°C	-55 to +90
	°F	-65 to +200
ELECTRICAL		
Rated Output – mV/V		2.00 ± 0.30
Zero Balance – %RO		±1.0
Input Resistance – Ohms		700 +100/-7
Output Resistance – Ohms		700 ±7
Insulation Resistance – Megohm		> 5000
Excitation – VDC NOM		10
Excitation – VDC MAX		20
MECHANICAL		
Overload:		
Safe Torsion – %CAP		±150
Ultimate Torsion – %CAP		±400
Safe Side Load	N	13, 110, 160, 280, 400
	lbf	3, 25, 36, 63, 90
Safe Overhung Moment – %CAP		100
Safe Mounting Torque	Nm	0.3, 3, 5, 6, 9
	in-lbf	2.7, 27, 44, 55, 80
Deflection at Capacity – Radian		0.007, 0.003, 0.003, 0.003, 0.003
Cable Length	m	1.5
	ft	5
Material		Aluminum

DIMENSIONS

See Drawing	CAPACITY	
	Metric (Nm)	U.S. (lbf-in)
	0.2, 2, 5, 10, 20	1.77, 17.7, 44, 89, 177
	mm	in
(1)	M5x0.8 - 6H x ↧ 5.1	M5x0.8 - 6H x ↧ 0.20
(2)	$\varnothing 3.02^{\pm 0.03}$ ↧ 3.0	$\varnothing 0.119^{\pm 0.001}$ ↧ 0.12
(3)	$\varnothing 6.02^{+0.03}$ THRU	Ø0.237 THRU
(4)	Ø25.0	Ø0.984
(5)	Ø34.93	Ø1.375
(6)	31.8	1.25
(7)	40.6	1.60
(8)	38.1	1.50
(9)	M5x0.8 - 6H x ↧ 5.1	M5x0.8 - 6H x ↧ 0.20

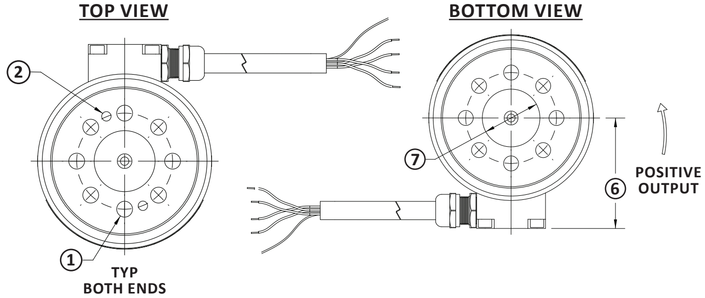
* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

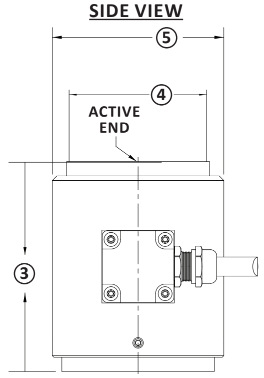
interface
FORCE MEASUREMENT SOLUTIONS.

MRT2 MINIATURE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 5 to 50 Nm (44 to 443 lbf-in)
- Proprietary Interface Temperature compensated strain gages
- Small size - 70 x 60 mm (2.75 x 2.25 in)
- Excellent linearity & repeatability
- Low deflection - high torsional stiffness





DIMENSIONS

See Drawing	CAPACITY	
	Metric (Nm)	U.S. (lbf-in)
	5, 10, 20, 50	44.3, 88.5, 177, 443
	mm	in
(1)	M5x0.8 - 6H x ↧ 8.1 8 PL EQ SP on 31.50 B.C.	M5x0.8 - 6H x ↧ 0.32 8 PL EQ SP on 1.240 B.C.
(2)	Ø3.18$^{+0.013/-0.000}$ 2 PL EQ SP on Ø34.93 B.C.	Ø0.125$^{+0.0005/-0.0000}$ 2 PL EQ SP on Ø1.375 B.C.
(3)	69.85	2.75
(4)	47.625	1.875
(5)	57.15	2.25
(6)	38.1	1.50
(7)	Ø20.000$^{+0.020/-0.000}$	Ø0.7874$^{+0.0008/-0.0000}$

STANDARD CONFIGURATION

MODEL MRT2 MINIATURE REACTION (Shown)

SPECIFICATIONS

ACCURACY – (MAX ERROR)					
Nonlinearity – %FS		± 0.10			
Hysteresis – %FS		± 0.10			
Nonrepeatability – %RO		± 0.05			
TEMPERATURE					
Effect on Zero – % / 100F°		±0.20			
Effect on Output – %RO / 100F°		±0.10			
Compensated Range	°C	-9 to +46			
	°F	+15 to +115			
Operating Range	°C	-54 to +93			
	°F	-65 to +200			
ELECTRICAL					
Output – mV/V		$2.00^{\pm 0.30}$			
Excitation – VDC MAX		20			
Bridge Resistance – Ohms		700 ± 7			
Electrical Connection – Integral Cable	m	1.5			
	ft	5			
MECHANICAL					
Safe torsion – %RO		150	150	150	150
Deflection at Capacity – rad		0.003	0.003	0.003	0.002
Overhung Moment – %CAP MAX		100	100	100	100
Shear – MAX	N	225	333	400	900
	lbf	50.6	74.9	89.9	202
Material		Aluminum			

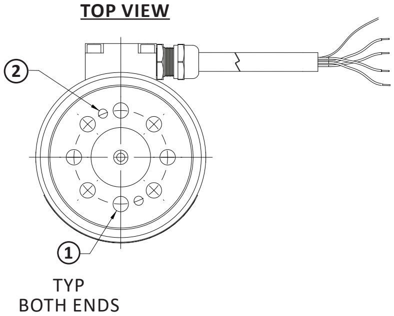
* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

MRT2P MINIATURE OVERLOAD PROTECTED TORQUE TRANSDUCER (U.S. & METRIC)

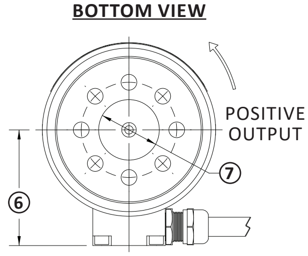
FEATURES & BENEFITS

- Capacities from 0.2 to 2 Nm(1.77 to 17.7 lbf-in)
- 3x overload protection
- Proprietary Interface Temperature compensated strain gages
- Small size - 70 x 60 mm (2.75 x 2.25 in)
- Excellent linearity & repeatability
- Low deflection - high torsional stiffness

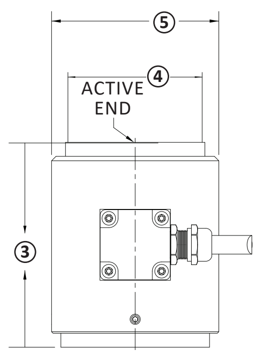
TOP VIEW



BOTTOM VIEW



SIDE VIEW



STANDARD CONFIGURATION

MODEL MRT2P (Shown)

DIMENSIONS

See Drawing	CAPACITY	
	Metric (Nm)	U.S. (lbf-in)
	0.2, 2	1.77, 17.7
	mm	in
(1)	ØM5x0.8 - 6H x ↧ 8.1 8 PL EQ SP on 31.50 B.C.	ØM5x0.8 - 6H x ↧ 0.32 8 PL EQ SP on 1.240 B.C.
(2)	Ø3.18$^{+0.013/-0.000}$ 2 PL EQ SP on 34.93 B.C.	Ø0.125$^{+0.0005/-0.0000}$ 2 PL EQ SP on 1.375 B.C.
(3)	6.985	0.275
(4)	47.625	1.875
(5)	57.15	2.25
(6)	38.1	1.50
(7)	Ø20.000$^{+0.020/-0.000}$	Ø0.7874$^{+0.0008/-0.0000}$

SPECIFICATIONS

ACCURACY – (MAX ERROR)			
Nonlinearity – %FS		± 0.10	
Hysteresis – %FS		± 0.10	
Nonrepeatability – %RO		± 0.05	
TEMPERATURE			
Compensated Range	°C	-9 to +46	
	°F	+15 to +115	
Operating Range	°C	-54 to +93	
	°F	-65 to +200	
Effect on Zero – % / 100F°		±0.20	
Effect on Output – %RO / 100F°		±0.10	
ELECTRICAL			
Output – mV/V		2.00 ± 0.30	
Excitation – VDC MAX		20	
Bridge Resistance – Ohms		700 ± 7	
Electrical Connection – Integral Cable	m	1.5	
	ft	5	
MECHANICAL			
Safe torsion – %RO		300	300
Deflection at Capacity – rad		0.01	0.007
Overhung Moment – %CAP MAX		100	100
Shear MAX	N	13	110
	lbf-in	2.9	25
Material		Aluminum	

***Patent Pending**

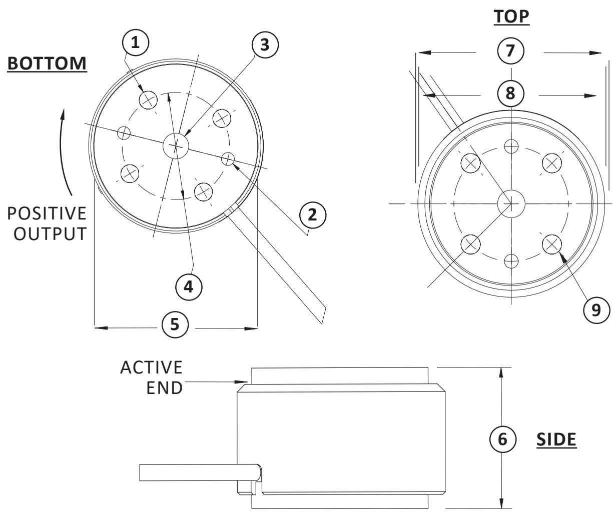
* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

INTERFACE
FORCE MEASUREMENT SOLUTIONS.

MRTP MINIATURE PROTECTED TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacity 0.2 Nm (1.77 lbf-in)
- 7x overload protection
- Proprietary Interface Temperature compensated strain gages
- Small size - 41 x 33 mm (1.6 in OD x 1.25 in)
- Excellent linearity & repeatability
- Low deflection - high torsional stiffness



Note:
Do not bridge overload stop and active end

DIMENSIONS

See Drawing	CAPACITY	
	Metric (Nm)	U.S. (lbf-in)
	0.2	1.77
	mm	in
(1)	M5x0.8 - 6H x ↧ 5.1	M5x0.8 - 6H x ↧ 0.20
(2)	Ø3.02 ± 0.03	Ø0.119 ± 0.001
(3)	Ø6.02 thru	Ø0.237 thru
(4)	Ø24.99	Ø0.984
(5)	34.95	1.375
(6)	31.8	1.25
(7)	40.6	1.60
(8)	38.1	1.50
(9)	M5x0.8 - 6H x ↧ 5.1	M5x0.8 - 6H x ↧ 0.20

OPTIONS

- Extra cable length

STANDARD CONFIGURATION

MODEL MRTP (Shown)

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		± 0.10
Hysteresis – %FS		± 0.10
Nonrepeatability – %RO		± 0.05
Creep, in 20 min – %		± 0.10
TEMPERATURE		
Compensated Range	°C	-10 to +45
	°F	+15 to +115
Operating Range	°C	-55 to +90
	°F	-65 to +200
Effect on Zero – %RO / 100°F		±0.20
Effect on Output – % / 100°F		±0.10
ELECTRICAL		
Rated Output – mV/V (Nominal)		2.00 ±0.30
Zero Balance – %RO		±1.0
Input Resistance – Ohms		700 + 100/-7
Output Resistance – Ohms		700 ± 7
Insulation Resistance – Megohm		> 5000
Excitation, VDC NOM		10
Excitation, VDC MAX		20
MECHANICAL		
Overload:		
Safe Torsion – %CAP		±700
Safe Side Load	N	13
	lbf	3
Safe Overhung Moment – %CAP		100
Safe Mounting Torque	Nm	0.3
	lbf-in	2.7
Deflection at Capacity – Radian		0.007
Cable Length – Integral Cable	m	1.5
	ft	5
Material		Aluminum

ACCESSORIES

- Instrumentation

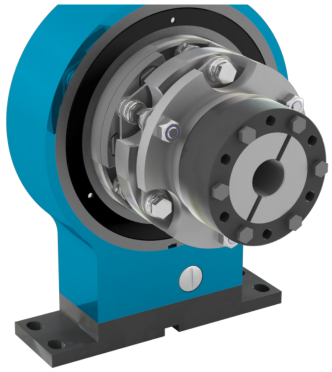
* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

T1 TORQUE COUPLING ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 50 to 1K Nm (443 to 8.85K)
- Shortest installed length
- Integrated double-flex disc coupling
- Hollow
- Bearingless non-contact design
- 16-bit resolution

STANDARD CONFIGURATION



MODEL T1 (Shown)

Specifications

ACCURACY – (MAX ERROR)		
Combined Error – %FS		±0.1
Nonrepeatability – %		±0.02
TEMPERATURE		
Effect on Zero – %RO / °C		±0.02
Effect on Output – % / °C		±0.01
Rated Range	°C	+5 to +45
	°F	+41 to +113
Operating Range	°C	0 to +60
	°F	+32 to +140
ELECTRICAL		
Output – VDC		±5
Bandwidth, Hz		3 kHz, 3dB
Sample Rate – kHz		10
Calibration Signal – %FS		100
Supply Voltage – VDC		12 - 18
Supply Current – mA		< 100
Electrical Connection – pin		12
Resolution – bit		16
MECHANICAL		
Safe Overload – %RO		200
Ultimate Overload – %RO		300
Max Speed – rpm		13.6K – See table
Material		Alloy steel

OPTIONS

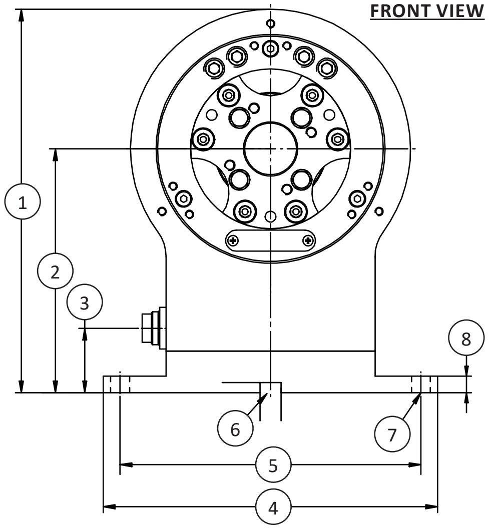
- Speed Measurement – 30 Pulse +5V TTL
- Keyway Side 1 (Reduced max diam dA)
- ±10 VDC Output
- RS485

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

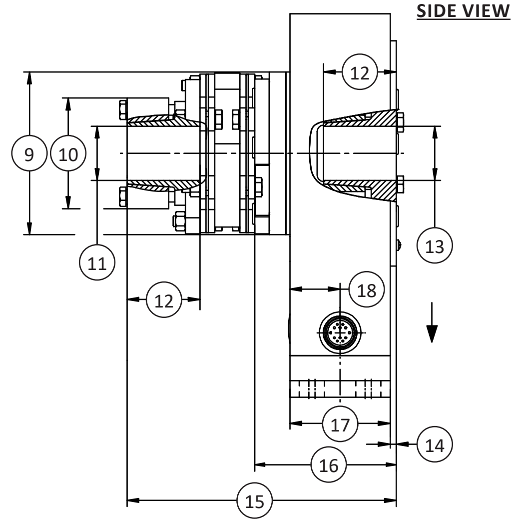
Size	Nominal Torque		Max Revolution	*Max ThrU.S.t Load		*Axial Displacement Max		*Angular Displacement Max (°)	*Radial Displacement Max	Spring-rate (Nm/rad)	Moment of Inertia (kg•m²)	
	Nm	lbf-in		N	lbf	mm	in				Side 1	Side 2
16	50	443	13,600	150	38.7	0.25	0.01	0.4° (0.2° per disc pack)	0.05	4.9E+04	2.1E-03	1.0E-03
	100	885								6.2E+04		
	150	1.33K								6.2E+04		
25	150	1.33K	11,800	190	42.7	0.25	0.01		0.05	1.2E+05	4.0E-03	1.8E-03
	200	1.77K								1.2E+05		
	250	2.21K								1.2E+05		
40	200	1.77K	10,100	250	56.2	0.3	0.012		0.06	1.3E+05	6.4E-03	3.7E-03
	300	2.66K								1.3E+05		
	400	3.54K								1.3E+05		
64	400	3.54K	8,500	450	101	0.3	0.012		0.06	3.1E+05	9.3E-03	8.5E-03
	500	4.43K								3.1E+05		
	600	5.31K								3.1E+05		
100	600	5.31K	7,300	600	135	0.45	0.018		0.07	4.8E+05	1.9E-02	1.6E-02
	750	6.64K								4.8E+05		
	1K	8.85K								4.8E+05		

T1 TORQUE COUPLING ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

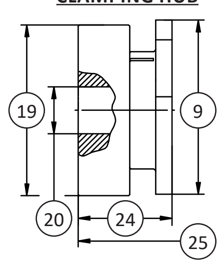
FRONT VIEW



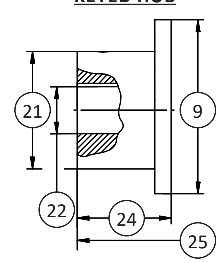
SIDE VIEW



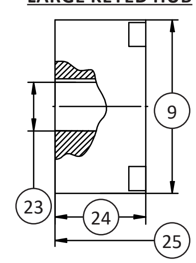
CLAMPING HUB



KEYED HUB



LARGE KEYED HUB



Dimensions

See Drawing		(1)		(2)		(3)		(4)		(5)		(6)		(7)	(8)		(9)	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in		mm	in	mm	in
Size	16	184	7.2	$117^{\pm0.1}$	$4.6^{\pm0.004}$	31	1.2	160	6.3	$144^{\pm0.1}$	$9.7^{\pm0.004}$	$Ø10^{+0.1}$ ↧ 5	$Ø0.4^{\pm0.004}$ ↧ 0.2	M8	8	0.3	77	3.0
	25	195	7.7	$122.5^{\pm0.1}$	$4.8^{\pm0.004}$	31	1.2	160	6.3	$144^{\pm0.1}$	$9.7^{\pm0.004}$	$Ø10^{+0.1}$ ↧ 5	$Ø0.4^{\pm0.004}$ ↧ 0.2	M8	8	0.3	89	3.5
	40	211	8.3	$130.5^{\pm0.1}$	$5.1^{\pm0.004}$	31	1.2	160	6.3	$144^{\pm0.1}$	$9.7^{\pm0.004}$	$Ø10^{+0.1}$ ↧ 5	$Ø0.4^{\pm0.004}$ ↧ 0.2	M8	8	0.3	104	4.1
	64	230	9.1	$140^{\pm0.1}$	$5.5^{\pm0.004}$	31	1.2	160	6.3	$144^{\pm0.1}$	$9.7^{\pm0.004}$	$Ø10^{+0.1}$ ↧ 5	$Ø0.4^{\pm0.004}$ ↧ 0.2	M8	8	0.3	123	4.8
	100	250	9.8	$150^{\pm0.1}$	$5.9^{\pm0.004}$	31	1.2	160	6.3	$144^{\pm0.1}$	$9.7^{\pm0.004}$	$Ø10^{+0.1}$ ↧ 5	$Ø0.4^{\pm0.004}$ ↧ 0.2	M8	8	0.3	143	5.6

See Drawing		(10)		(11)		(12)		(13)		(14)		(15)		(16)		(17)	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
Size	16	53	2.1	14-26	0.6-1.0	35	1.4	14-26	0.6-1.0	3	0.1	129	5.1	68	2.7	48	1.9
	25	64	2.5	20-36	0.8-1.4	40	1.6	20-36	0.8-1.4	3	0.1	134.6	5.3	68	2.7	48	1.9
	40	74	2.9	25-45	1.0-1.8	45	1.8	25-45	1.0-1.8	3	0.1	143.8	5.7	68	2.7	48	1.9
	64	84	3.3	30-45	1.2-1.8	50	20	30-45	1.2-1.8	3	0.1	155.2	6.1	68	2.7	48	1.9
	100	104	4.1	35-55	1.4-2.2	55	2.2	35-55	1.4-2.2	3	0.1	160.2	6.3	68	2.7	48	1.9

See Drawing		(18)		(19)		(20)		(21)		(22)		(23)		(24)		(25)	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
Size	16	24	0.9	73	2.9	20-35	0.8-1.4	50	2.0	16-32	0.6-1.3	30-45	1.2-1.8	40	1.6	121	4.8
	25	24	0.9	84	3.3	22-40	0.9-1.6	60	2.4	20-40	0.8-1.6	35-55	1.4-2.2	45	1.8	139.6	5.5
	40	24	0.9	97	3.8	25-45	1.0-1.8	70	2.8	25-50	1.0-2.0	45-65	1.8-2.6	55	2.2	153.8	6.1
	64	24	0.9	115	4.5	28-55	1.1-2.2	80	3.1	30-55	1.2-2.2	55-75	2.2-3.0	65	2.6	170.2	6.7
	100	24	0.9	135	4.5	32-68	1.3-2.7	100	3.9	35-70	1.4-2.8	65-95	2.6-3.7	75	3.0	180.2	7.1

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

FORCE MEASUREMENT SOLUTIONS.

T2 PRECISION ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 0.1 to 20K Nm (0.88 to 177K lbf-in)
- Speed up to 15K RPM
- ±5 VDC output
- 12-28 VDC supply
- Contactless data transmission
- Digital electronics with on-shaft shunt
- 0.1% combined error
- 10 kHz sample rate
- 16-bit resolution
- Very short overall length

Specifications

ACCURACY – (MAX ERROR)		
Combined Error – %FS		±0.1
Nonrepeatability – %FS		±0.02
Resolution – bit		16
TEMPERATURE		
Effect on Zero – %RO / °C		±0.02
Effect on Output – % / °C		±0.01
Compensated Range	°C	+5 to +45
	°F	+41 to +113
Operating Range	°C	0 to +60
	°F	+32 to +140
Storage Range	°C	-10 to +70
	°F	+14 to +158
ELECTRICAL		
Supply Voltage – VDC		12 - 28
Supply Current – mA		≤ 60
Output – VDC		±5
Bandwidth, Hz (-3dB)		1,000
Sample Rate – Hz		10,000
Calibration Signal – %FS		100
Electrical Connection		12-pin binder series 581 (includes mate)
ENCODER OPTION		
Capacities	0.1 - 1K Nm	360 pulse/rev, 2-track, +5V TTL, 90° offset, quadrature encoder
	0.88 - 8.85K lbf-in	
	2K - 20K Nm	60 pulse/rev, 1-track, +5V TTL
	17K - 177K lbf-in	
MECHANICAL		
Safe Overload – %RO		200
Max Speed – RPM		Varies with Capacity (see table)
Shaft Material		Alloy steel
HoU.S.ing Material		Aluminum

STANDARD CONFIGURATION

MODEL T2 (Shown)

OPTIONS

- Speed and angle output – 360 Pulse TTL, 2-Tracks
- 90° offset, available on capacities up to 1K Nm (8.85K lbf-in) only
- +10V Torque Output
- RS485
- Keyed shafts – per DIN 6885.1
- ±0.05% combined error
- Mating cable assembly

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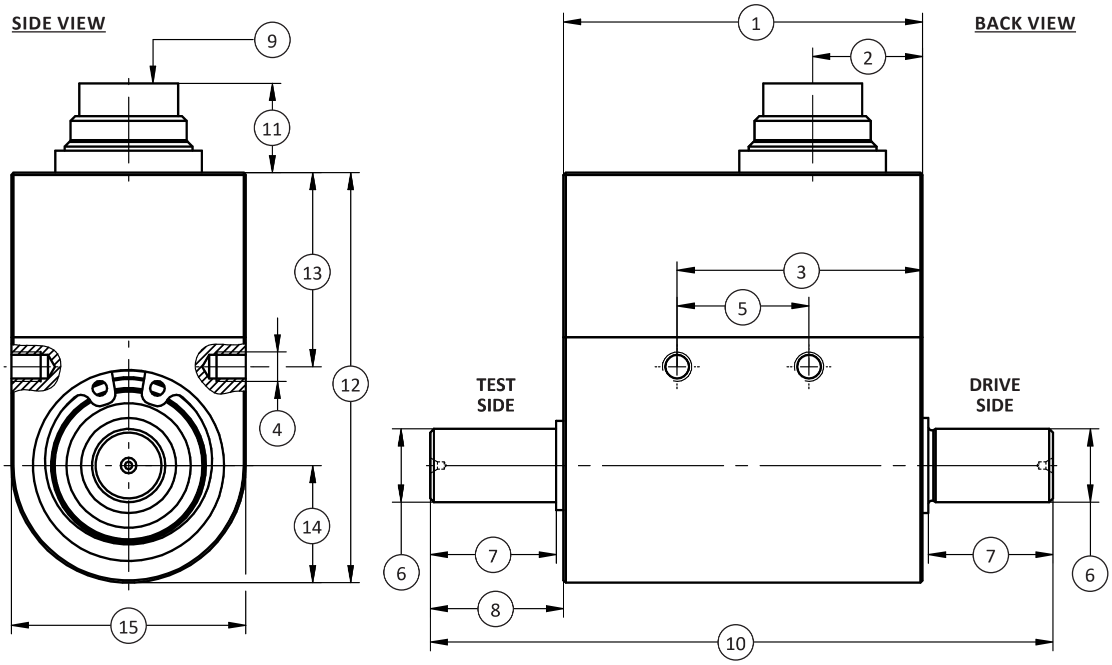
T2 PRECISION ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

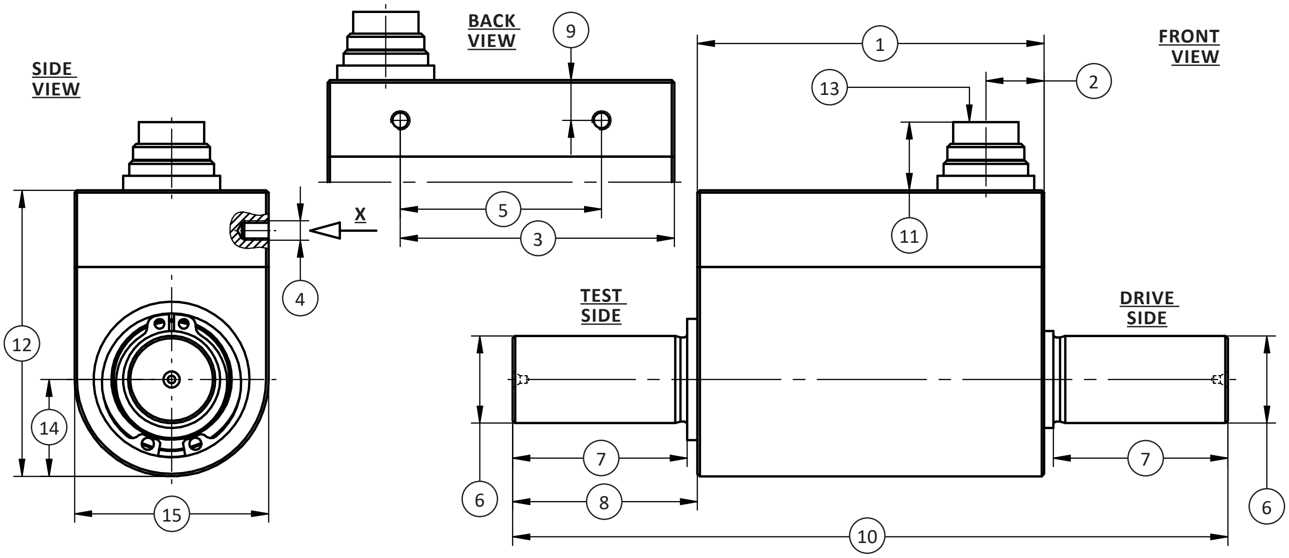


Dimensions

See Drawing	CAPACITIES			
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	0.1, 0.2, 0.5, 1, 2, 5	0.88, 1.77, 4.43, 8.85, 17.7, 44.3	10	88.5
	mm	in	mm	in
(1)	49	1.9	49	1.9
(2)	15	0.6	15	0.6
(3)	33.5	1.32	33.5	1.32
(4)	M4 ↧ 4	M4 ↧ 0.2	M4 ↧ 4	M4 ↧ 0.2
(5)	18	0.7	18	0.7
(6)	Ø8g6	Ø0.3148 / 0.3144	Ø10g6	Ø0.3935 / 0.3931
(7)	17	0.67	17	0.67
(8)	18	0.7	18	0.7
(9)	Connector 12-pin		Connector 12-pin	
(10)	85	3.35	85	3.35
(11)	12	0.5	12	0.5
(12)	56	2.2	56	2.2
(13)	26.5	1.04	26.5	1.04
(14)	16	0.6	16	0.6
(15)	32	1.3	32	1.3

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

T2 PRECISION ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



Dimensions (CONTINUED)

See Drawing	CAPACITIES					
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	20, 30	177, 265	50, 100	443, 885	200, 500	1.77K, 4.43K
	mm	in	mm	in	mm	in
(1)	71.5	2.81	71.5	2.81	72.5	2.85
(2)	12	0.5	12	0.5	15	0.6
(3)	56.5	2.2	56.5	2.2	51.5	2.03
(4)	M4 ↧ 5	M4 ↧ 0.2	M4 ↧ 5	M4 ↧ 0.2	M4 ↧ 6	M4 ↧ 0.2
(5)	41.5	1.63	41.5	1.63	29.5	1.16
(6)	Ø18g6	Ø0.7087 / 0.7082	Ø18g6	Ø0.7087 / 0.7082	Ø32g6	Ø1.2595 / 1.2589
(7)	18	0.71	36	1.42	38	1.50
(8)	20	0.79	38	1.50	43.5	1.71
(9)	8.3	0.33	8.3	0.33	8.3	0.33
(10)	111.5	4.39	147.5	5.81	159.5	6.28
(11)	14	0.6	14	0.6	14	0.6
(12)	59	2.32	59	2.32	76	2.99
(13)	Connector 12-pin		Connector 12-pin		Connector 12-pin	
(14)	20	0.79	20	0.79	29	1.14
(15)	40	1.57	40	1.57	58	2.28

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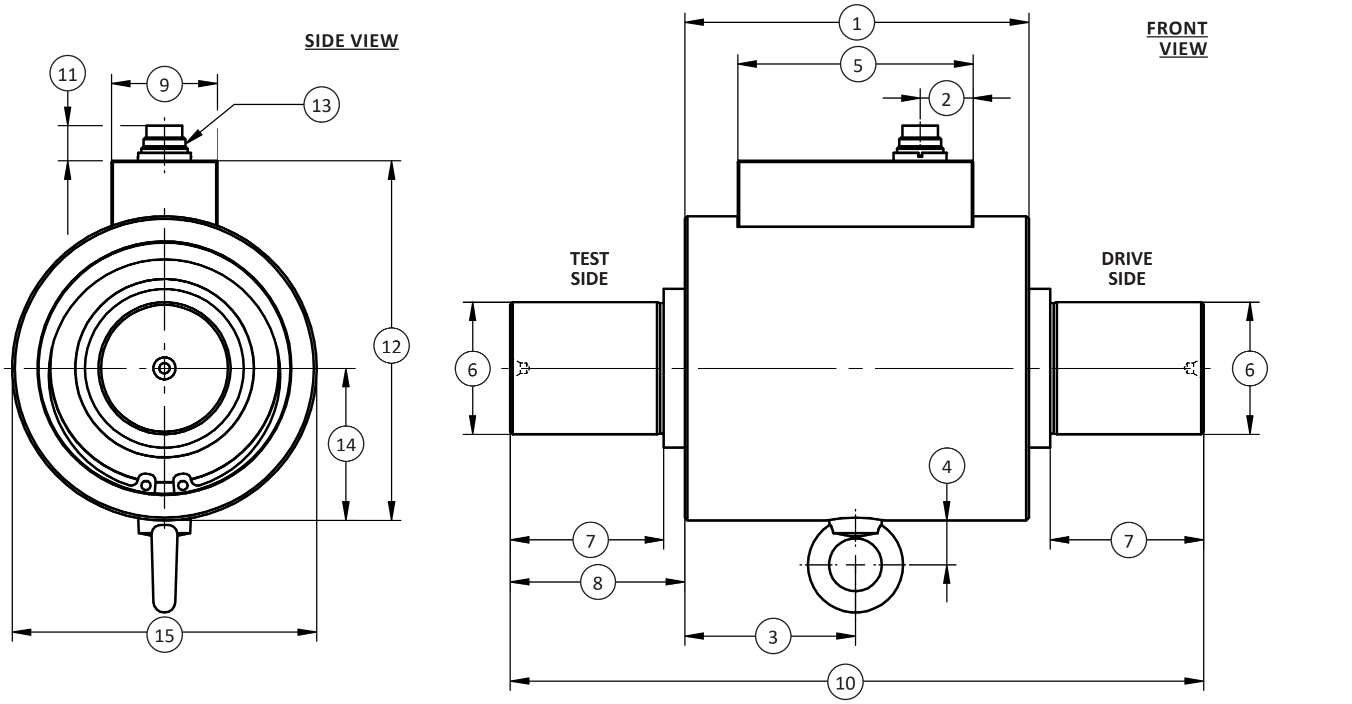
T2 PRECISION ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



Dimensions (CONTINUED)

See Drawing	CAPACITIES					
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	1K	8.85K	2K, 5K	17K, 44.3K	10K, 20K	85.5K, 177K
	mm	in	mm	in	mm	in
(1)	130	5.12	135	5.31	190	6.70
(2)	20	0.8	20	0.8	20	0.8
(3)	64.5	2.54	67.5	2.66	95	3.7
(4)	17	0.7	17	0.7	17	0.7
(5)	89	3.5	89	3.5	89	3.5
(6)	Ø50g6	Ø1.9685 / 1.9675	Ø70g6	Ø2.7559 / 2.7547	Ø110g6	Ø4.3307 / 4.3293
(7)	58	2.28	110	4.33	120	4.72
(8)	66	2.60	121	4.76	140	5.51
(9)	40	1.6	40	1.6	40	1.6
(10)	262	10.3	377	14.8	470	18.5
(11)	13	0.5	13	0.5	13	0.5
(12)	136	5.4	161	6.3	233	9.2
(13)	Connector 12-pin		Connector 12-pin		Connector 12-pin	
(14)	57.5	2.26	69.5	2.74	105	4.1
(15)	Ø115	Ø4.5	Ø139	Ø5.5	Ø210	Ø8.3

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T2 PRECISION ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

PERFORMANCE PARAMETERS

CAPACITY		MAX RPM	SPRING RATE	MOMENT OF INERTIA (kg•m²) [1]		MAX THRU.S.T LOAD [2]		MAX SHEAR LOAD [2]	
Nm	lbf-in		NM/rad	Drive Side	Test Side	N	lbf-in	N	lbf-in
0.1	0.88	15,000	$1.8x10^{1}$	$1.9x10^{-6}$	$2.8x10^{-7}$	42	9.44	0.9	0.20
0.2	1.77	15,000	$1.8x10^{1}$	$1.9x10^{-6}$	$2.8x10^{-7}$	58	13.0	1.2	0.27
0.5	4.43	15,000	$1.2x10^{2}$	$1.9x10^{-6}$	$2.8x10^{-7}$	172	38.7	1.9	0.43
1	8.85	15,000	$1.2x10^{2}$	$1.9x10^{-6}$	$2.8x10^{-7}$	227	51.0	2.9	0.65
2	17.7	15,000	$3.6x10^{2}$	$1.9x10^{-6}$	$2.9x10^{-7}$	348	78.2	5.5	1.24
5	44.3	15,000	$4.0x10^{2}$	$1.9x10^{-6}$	$2.9x10^{-7}$	650	146	14	3.15
10	88.5	15,000	$9.3x10^{2}$	$2.1x10^{-6}$	$3.8x10^{-7}$	1K	225	26	5.85
20	177	15,000	$4.5x10^{3}$	$1.2x10^{-5}$	$9.9x10^{-6}$	1.68K	378	43	9.67
30	265	15,000	$4.5x10^{3}$	$1.2x10^{-5}$	$9.9x10^{-6}$	2.2K	495	65	14.6
50	443	15,000	$8.5x10^{3}$	$1.3x10^{-5}$	$1.2x10^{-5}$	3.1K	697	80	18.0
100	885	12,000	$8.5x10^{3}$	$1.3x10^{-5}$	$1.2x10^{-5}$	4.8K	1.08K	160	36.0
200	1.77K	10,000	$6.7x10^{4}$	$1.0x10^{-4}$	$9.0x10^{-5}$	8K	1.80K	290	65.2
500	4.43K	10,000	$7.1x10^{4}$	$1.0x10^{-4}$	$9.0x10^{-5}$	14K	3.15K	700	157
1K	8.85K	8,000	$3.1x10^{5}$	$1.6x10^{-3}$	$1.1x10^{-3}$	23K	5.17K	900	202
2K	17K	5,500	$7.2x10^{5}$	$5.3x10^{-3}$	$4.3x10^{-3}$	33K	7.42K	1.2K	270
5K	44.3K	5,500	$8.0x10^{5}$	$5.4x10^{-3}$	$4.3x10^{-3}$	57K	12.8K	2.8K	629
10K	85.5K	5,000	$3.1x10^{6}$	$4.0x10^{-2}$	$3.7x10^{-2}$	90K	20.2K	4.4K	989
20K	177K	5,000	$3.7x10^{6}$	$4.0x10^{-2}$	$3.8x10^{-2}$	130K	29.2K	8.2K	1.84K

Notes:
1 = Without encoder option
2 = Unsupported shaft

Electrical CONNECTION

Pin	12-PIN Electrical CONNECTION		12-PIN RS485 OPTION	
	Function	Description	Function	Description
A	NC	–	NC	–
B	Option Angle B	TTL	Option Angle B	TTL
C	Signal (+)	±5 VDC (±10 VDC)	NC	–
D	Signal (GND)	0 VDC	NC	–
E	Supply (GND)	0 VDC, TTL	Supply (GND)	0 VDC
F	Supply (+)	12-28 V	Supply (+)	12-28 VDC
G	Option Angle A	TTL	Option Angle A	TTL
H	NC	–	NC	–
J	NC	–	RS485 Option	RS485 (B)
K	Cal. Control	L < 2.0 V / H > 3.5 V	NC	–
L	NC	–	RS485 Option	RS485 (A)
M	HoU.S.ing	–	HoU.S.ing	–

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FORCE MEASUREMENT SOLUTIONS.

T3 PRECISION-PEDESTAL MOUNT ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 0.1 to 20K Nm (0.88 to 177K lbf-in)
- Speed up to 15K RPM
- ±5 VDC output
- 12-28 VDC supply
- Contactless data transmission
- Digital electronics with on-shaft shunt
- 0.1% combined error
- 10 kHz sample rate
- 16-bit resolution
- Very short overall length

Specifications

ACCURACY – (MAX ERROR)		
Combined Error – %FS		±0.1
Nonrepeatability – %FS		±0.02
Resolution – bit		16
TEMPERATURE		
Effect on Zero – %RO / °C		±0.02
Effect on Output – % / °C		±0.01
Compensated Range	°C	+5 to +45
	°F	+41 to +113
Operating Range	°C	0 to +60
	°F	+32 to +140
Storage Range	°C	-10 to +70
	°F	+14 to +158
ELECTRICAL		
Supply Voltage – VDC		12 - 28
Supply Current – mA		≤ 60
Output – VDC		±5
Bandwidth – kHz – dB		1 – -3
Sample Rate – kHz		10
Calibration Signal – %FS		100
Electrical Connection		12-pin binder series 581 (includes mate)
ENCODER OPTIONS		
Capacities	0.1 - 1K Nm	360 pulse/rev, 2-track, +5V TTL, 90° offset, quadrature encoder
	0.88 - 8.85K lbf-in	
	2K - 20K Nm	60 pulse/rev, 1-track, +5V TTL,
	17K - 177K lbf-in	
MECHANICAL		
Safe Overload – %RO		200
Max Speed – RPM		Varies with capacity (see table)
Shaft Material		Alloy steel
HoU.S.ing Material		Aluminum

STANDARD CONFIGURATION

MODEL T3 (Shown)

OPTIONS

- Speed and angle output - 360 pulse TTL, 2-tracks 90° offset, available on capacities up to 1K Nm (8.85K lbf-in) only
- Speed output - 60 Pulse TTL, 1-Track, available on capacities 2K Nm (17.7K lbf-in) and above
- +10V output
- RS485
- Keyed shafts - per DIN 6885.1
- ±0.05% combined error
- Mating cable assembly

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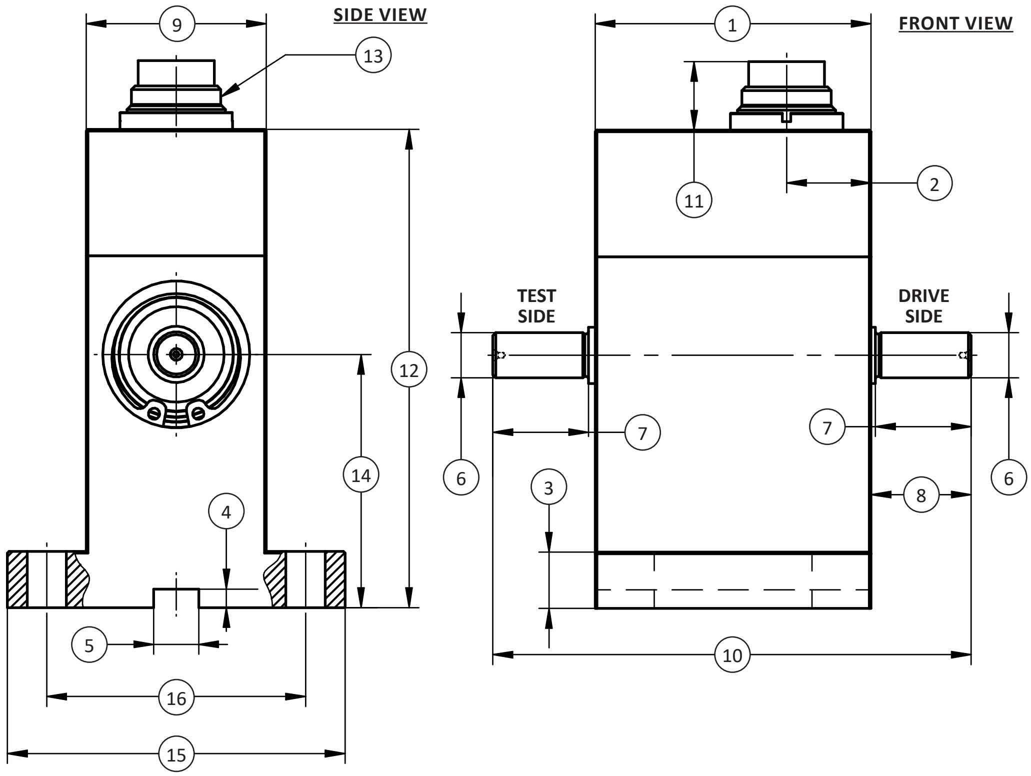
T3 PRECISION-PEDESTAL MOUNT ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

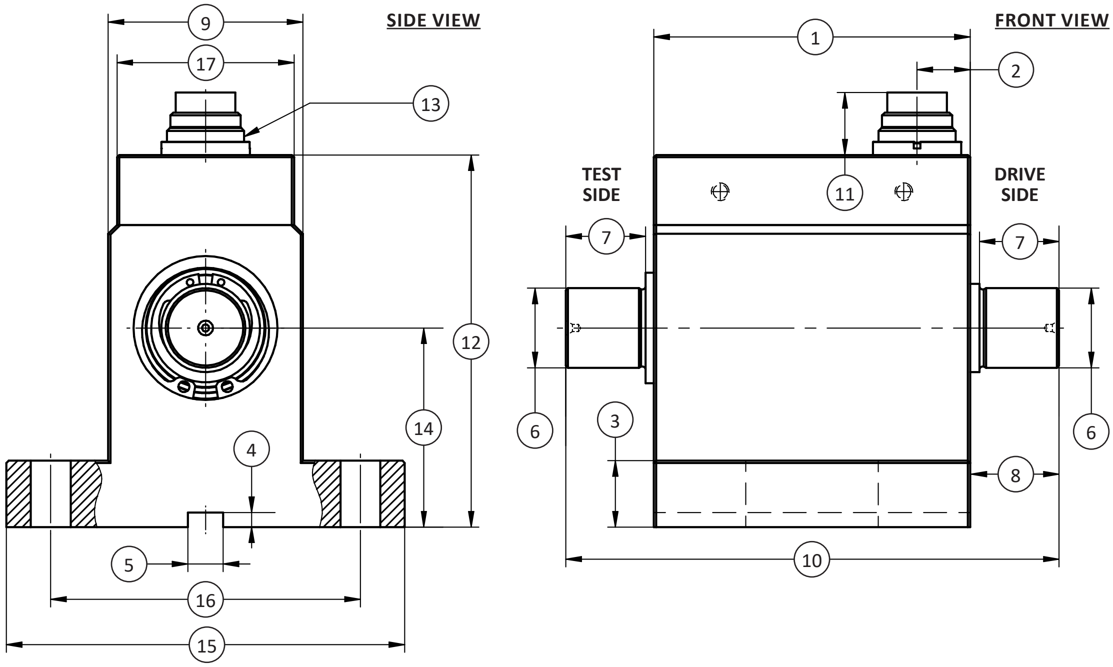


Dimensions

See Drawing	CAPACITIES			
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	0.1, 0.2	0.88, 1.77	0.5, 1	4.43, 8.85
	mm	in	mm	in
(1)	49	1.9	49	1.9
(2)	15	0.6	15	0.6
(3)	10	0.4	10	0.4
(4)	33	1.3	33	1.3
(5)	8N9	0.3150 / 0.3135	8N9	0.3150 / 0.3135
(6)	Ø8g6	Ø0.3148 / 0.3144	Ø8g6	Ø0.3148 / 0.3144
(7)	17	0.67	17	0.67
(8)	18	0.7	18	0.7
(9)	32	1.3	32	1.3
(10)	85	3.35	85	3.35
(11)	12	0.5	12	0.5
(12)	85	3.35	85	3.35
(13)	Connector 12-pin		Connector 12-pin	
(14)	45	1.8	45	1.8
(15)	60	2.4	60	2.4
(16)	46	1.8	46	1.8

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

T3 PRECISION-PEDESTAL MOUNT ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

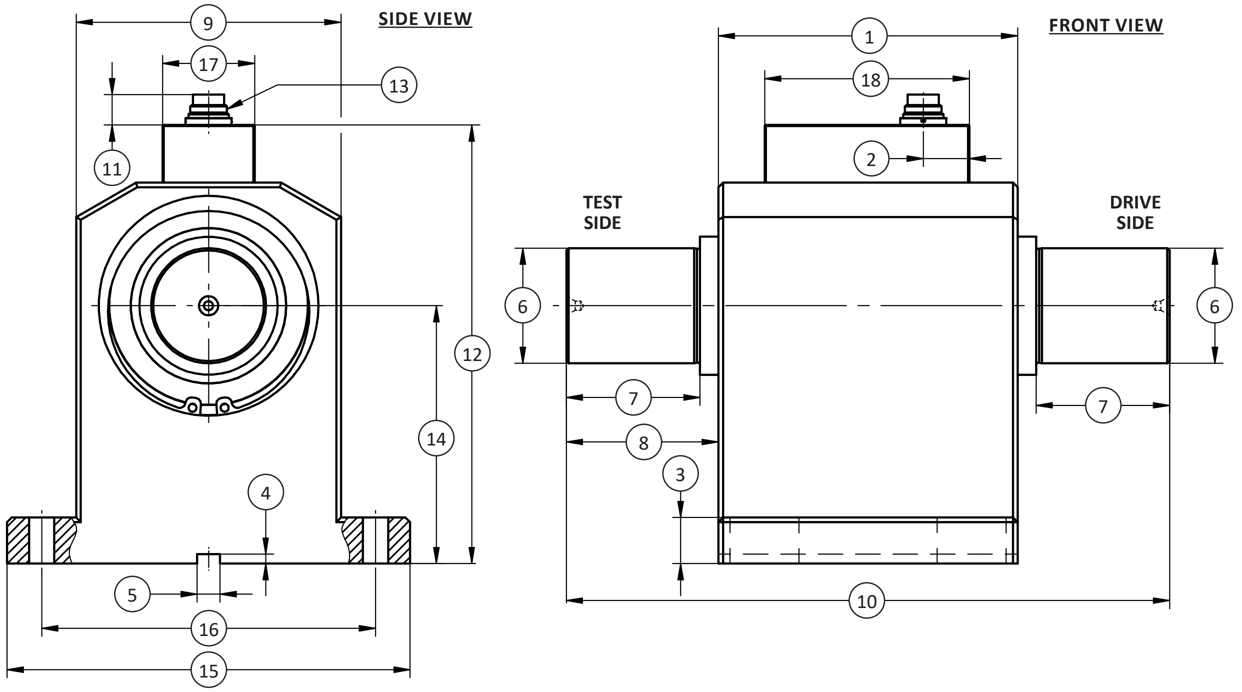


Dimensions (CONTINUED)

See Drawing	CAPACITIES							
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	2, 5	17.7, 44.3	10	8.85	20, 30	177, 265	50, 100	443, 885
	mm	in	mm	in	mm	in	mm	in
(1)	71.5	2.81	71.5	2.81	71.5	2.81	71.5	2.81
(2)	12	0.5	12	0.5	12	0.5	12	0.5
(3)	15	0.6	15	0.6	15	0.6	15	0.6
(4)	33	1.3	33	1.3	33	1.3	33	1.3
(5)	8N9	0.3150 / 0.3135	8N9	0.3150 / 0.3135	8N9	0.3150 / 0.3135	8N9	0.3150 / 0.3135
(6)	Ø8g6	Ø0.3156 / 0.3150	Ø10g6	Ø0.3943 / 0.3937	Ø18g6	Ø0.7094 / 0.7087	Ø18g6	Ø0.7094 / 0.7087
(7)	17	0.67	17	0.67	18	0.7	36	1.4
(8)	18	0.7	18	0.7	20	0.8	38	1.5
(9)	44	1.7	44	1.7	44	1.7	44	1.7
(10)	107.5	4.23	107.5	4.23	111.5	4.39	147.5	5.81
(11)	14	0.6	14	0.6	14	0.6	14	0.6
(12)	84	3.3	84	3.3	84	3.3	84	3.3
(13)	Connector 12-pin		Connector 12-pin		Connector 12-pin		Connector 12-pin	
(14)	45	1.8	45	1.8	45	1.8	45	1.8
(15)	90	3.5	90	3.5	90	3.5	90	3.5
(16)	70	2.8	70	2.8	70	2.8	70	2.8
(17)	40	1.6	40	1.6	40	1.6	40	1.6

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

T3 PRECISION-PEDESTAL MOUNT ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



Dimensions (CONTINUED)

See Drawing	CAPACITIES							
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	200, 500	1.77K, 4.43K	1K	8.85K	2K, 5K	17K, 44.3K	10K, 20K	85.5K, 177K
	mm	in	mm	in	mm	in	mm	in
(1)	130	5.12	130	5.12	135	5.31	190	7.48
(2)	20	0.79	20	0.79	20	0.79	20	0.79
(3)	20	0.79	20	0.79	25	0.98	40	1.57
(4)	4.1	0.16	4.1	0.16	4.1	0.16	4.1	0.16
(5)	10N9	0.3937 / 0.3923	10N9	0.3937 / 0.3923	10N9	0.3937 / 0.3923	10N9	0.3937 / 0.3923
(6)	Ø32g6	Ø1.2595 / 1.2589	50g6	Ø1.9681 / 1.9675	70g6	Ø2.7555 / 2.7548	110g6	Ø4.3302 / 4.3294
(7)	38	1.50	58	2.28	110	4.33	120	4.72
(8)	43.5	1.71	66	2.60	121	4.76	140	5.51
(9)	115	4.53	115	4.63	139	5.47	210	8.27
(10)	217	8.54	262	10.31	377	14.84	470	18.50
(11)	13	0.5	13	0.5	13	0.5	13	0.5
(12)	190.4	7.50	190.4	7.50	251.5	9.90	343	13.5
(13)	Connector 12-pin		Connector 12-pin		Connector 12-pin		Connector 12-pin	
(14)	112	4.41	112	4.41	160	6.30	215	8.46
(15)	175	6.89	175	6.89	207	8.15	300	11.81
(16)	145	5.7	145	5.7	173	6.8	260	10.2
(17)	40	1.5	40	1.5	40	1.5	40	1.5
(18)	89	3.50	89	3.50	89	3.50	89	3.50

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

FORCE MEASUREMENT SOLUTIONS.

T3 PRECISION-PEDESTAL MOUNT ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

PERFORMANCE PARAMETERS

CAPACITY		MAX RPM	SPRING RATE	MOMENT OF INERTIA ($Kg•m^2$) [1]		MAX THRU.S.T LOAD [2]		MAX SHEAR LOAD [2]	
Nm	lbf-in		(NM/rad)	Drive Side	Test Side	N	lbf	N	lbf
0.1	0.88	15,000	1.8x10^{1}	1.9x10^{-6}	2.8x10^{-7}	30	6.74	0.9	0.20
0.2	1.77	15,000	1.8x10^{1}	1.9x10^{-6}	2.8x10^{-7}	30	6.74	1.2	0.27
0.5	4.43	15,000	1.2x10^{2}	1.9x10^{-6}	2.8x10^{-7}	30	6.74	2.9	0.65
1	8.85	15,000	1.2x10^{2}	2.0x10^{-6}	2.8x10^{-7}	30	6.74	2.9	0.65
2	17.7	12,000	4.4x10^{2}	1.0x10^{-5}	8.1x10^{-6}	62	13.9	8.5	1.91
5	44.3	12,000	4.4x10^{2}	1.0x10^{-5}	8.1x10^{-6}	62	13.9	8.5	1.91
10	88.5	12,000	1.7x10^{3}	1.0x10^{-5}	8.2x10^{-6}	62	13.9	28	6.29
20	177	12,000	4.5x10^{3}	1.2x10^{-5}	9.9x10^{-6}	62	13.9	43	9.67
30	265	12,000	4.5x10^{3}	1.2x10^{-5}	9.9x10^{-6}	62	13.9	65	14.6
50	443	12,000	8.5x10^{3}	1.3x10^{-5}	1.2x10^{-5}	62	13.9	64	14.4
100	885	12,000	8.4x10^{3}	1.3x10^{-5}	1.2x10^{-5}	62	13.9	64	14.4
200	1.77K	7,000	9.2x10^{4}	1.3x10^{-3}	8.0x10^{-4}	760	171	350	78.7
500	4.43K	7,000	9.2x10^{4}	1.3x10^{-3}	8.0x10^{-4}	760	171	420	94.4
1K	8.85K	7,000	3.1x10^{5}	1.6x10^{-3}	1.1x10^{-3}	760	171	800	180
2K	17K	5,500	7.2x10^{5}	5.3x10^{-3}	4.3x10^{-3}	1.1K	247	860	193
5K	44.3K	5,500	8.0x10^{5}	5.4x10^{-3}	4.3x10^{-3}	1.1K	247	860	193
10K	85.5K	3,500	3.1x10^{6}	4.0x10^{-2}	3.7x10^{-2}	2.8K	629	2.3K	517
20K	177K	3,500	3.7x10^{6}	4.0x10^{-2}	3.8x10^{-2}	2.8K	629	2.3K	517

1 = Without encoder option
2 = Unsupported shaft

Electrical CONNECTION

Pin	12-PIN Electrical CONNECTION		12-PIN RS485 OPTION	
	Function	Description	Function	Description
A	NC	–	NC	–
B	Option Angle B	TTL	Option Angle B	TTL
C	Signal (+)	±5 VDC (±10 VDC)	NC	–
D	Signal (GND)	0 VDC	NC	–
E	Supply (GND)	0 VDC, TTL	Supply (GND)	0 VDC
F	Supply (+)	12-28 V	Supply (+)	12-28 VDC
G	Option Angle A	TTL	Option Angle A	TTL
H	NC	–	NC	–
J	NC	–	RS485 Option	RS485 (B)
K	Cal. Control	L < 2.0V / H > 3.5V	NC	–
L	NC	–	RS485 Option	RS485 (A)
M	HoU.S.ing	–	HoU.S.ing	–

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

T4 GENERAL PURPOSE ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 0.1 to 1K Nm (0.88 to 8.85K lbf-in)
- Speed up to 15K RPM
- ±5 VDC output
- 12-28 VDC supply
- Contactless data transmission
- Digital electronics with on-shaft shunt
- 0.2% combined error
- 10 kHz sample rate
- 12-bit resolution
- Very short overall length

Specifications

ACCURACY – (MAX ERROR)		
Combined Error – %FS		±0.2
Nonrepeatability – %FS		±0.04
Resolution – bit		12
TEMPERATURE		
Effect on Zero – %RO / °C		±0.03
Effect on Output – % / °C		±0.015
Compensated Range	°C	+5 to +45
	°F	+41 to +113
Operating Range	°C	0 to +60
	°F	+32 to +140
Storage Range	°C	-10 to +70
	°F	+14 to +158
ELECTRICAL		
Supply Voltage – VDC		12 - 28
Supply Current – mA		< 60
Output – VDC		±5
Bandwidth, Hz (-3dB)		1K
Sample Rate – Hz		10K
Calibration Signal – %FS		100
Electrical Connection		12-pin Binder series 581 (Includes Mate)
ENCODER OPTIONS		
Capacities	0.1 - 1K Nm	360 Pulse/Rev, 2-Track, +5V TTL, 90° Offset, Quadrature Encoder
	0.88 - 8.85K lbf-in	
MECHANICAL		
Safe Overload – %RO		200
Max Speed – RPM		Varies with Capacity (see table)
Shaft Material		Alloy Steel
HoU.S.ing Material		Aluminum

STANDARD CONFIGURATION

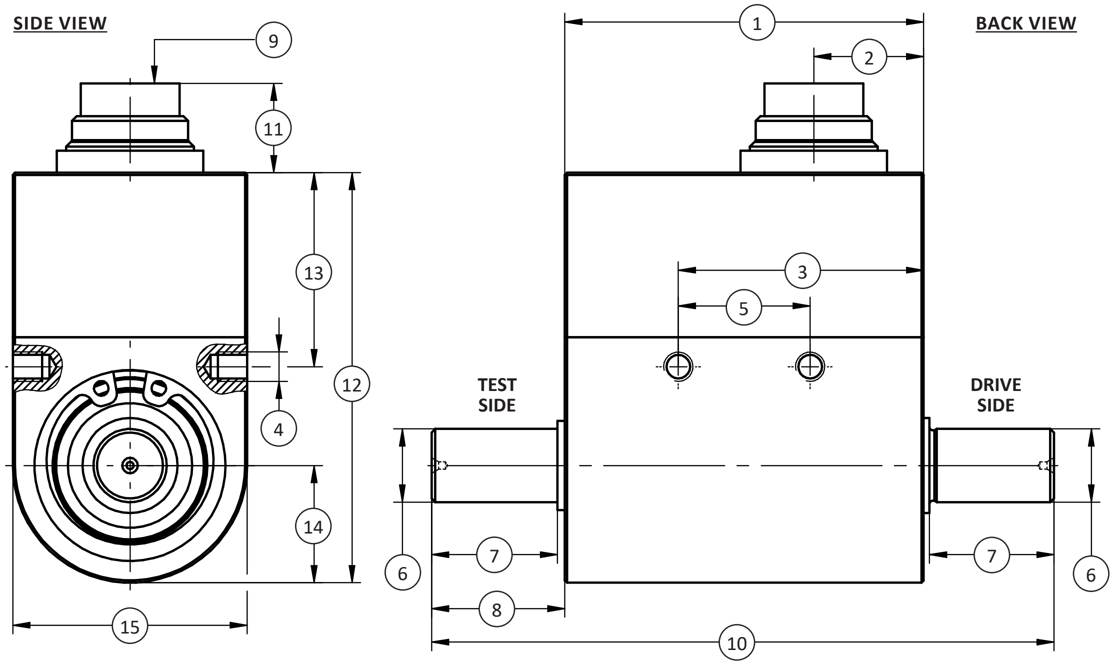
MODEL T4 (Shown)

OPTIONS

- Speed and angle output – 360 pulse TTL, 2-tracks 90° offset
- ±10V torque output
- RS485
- Keyed shafts – per DIN 6885.1
- Mating cable assembly

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

T4 GENERAL PURPOSE ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

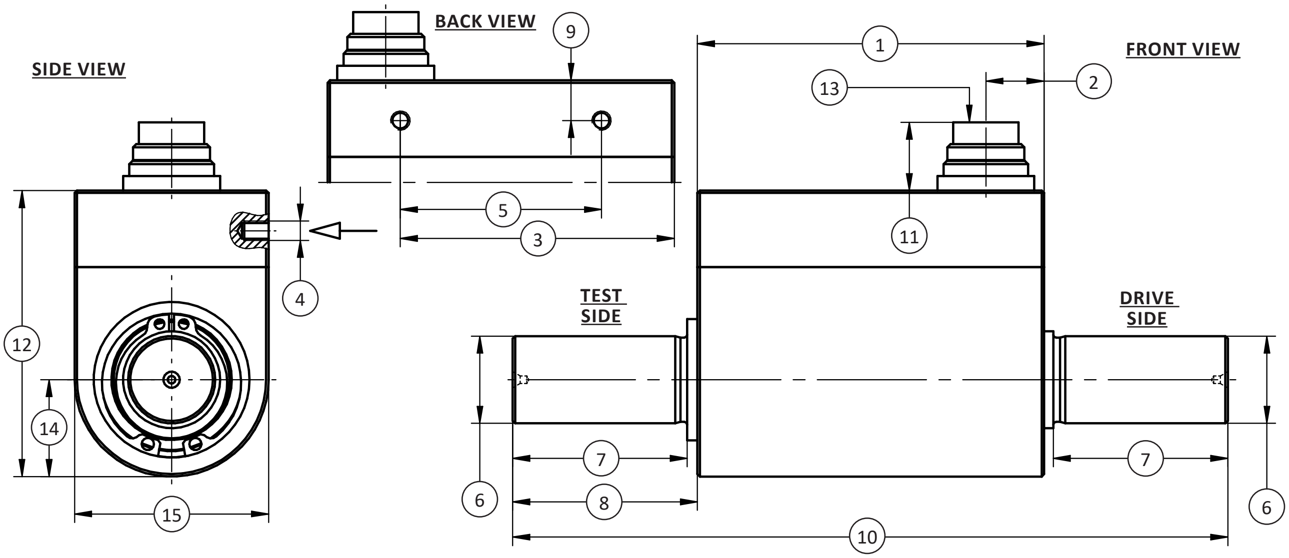


Dimensions

See Drawing	CAPACITIES			
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	0.1, 0.2, 0.5, 1, 2, 5	0.88, 1.77, 4.43, 8.85, 17.7, 44.3	10	88.5
	mm	in	mm	in
(1)	49	1.9	49	1.9
(2)	15	0.6	15	0.6
(3)	33.5	1.32	33.5	1.32
(4)	M4 ↧ 4	M4 ↧ 0.2	M4 ↧ 4	M4 ↧ 0.2
(5)	18	0.7	18	0.7
(6)	Ø8g6	Ø0.3148 / 0.3144	Ø10g6	Ø0.3935 / 0.3931
(7)	17	0.67	17	0.67
(8)	18	0.7	18	0.7
(9)	Connector 12-pin		Connector 12-pin	
(10)	85	3.35	85	3.35
(11)	12	0.5	12	0.5
(12)	56	2.2	56	2.2
(13)	26.5	1.04	26.5	1.04
(14)	16	0.6	16	0.6
(15)	32	1.3	32	1.3

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

T4 GENERAL PURPOSE ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

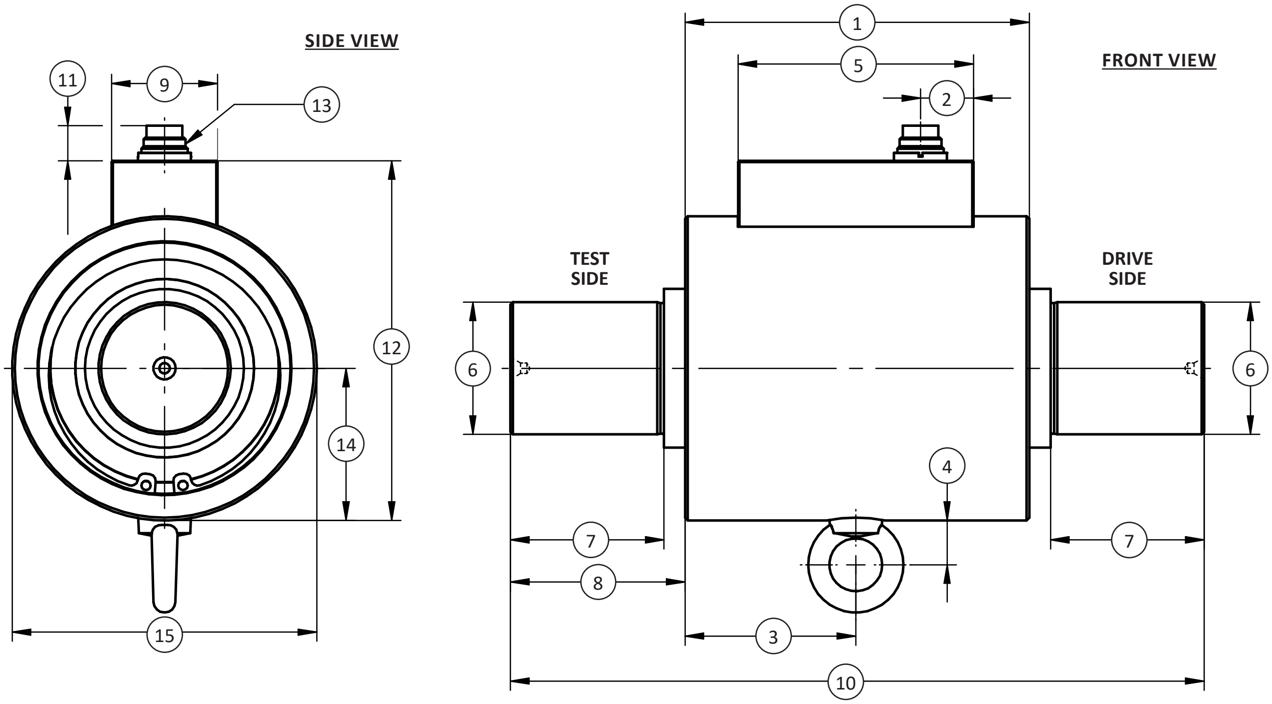


Dimensions (CONTINUED)

See Drawing	CAPACITIES					
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	20, 30	**177, 265**	**50, 100**	**443, 885**	**200, 500**	**1.77K, 4.43K**
	mm	in	mm	in	mm	in
(1)	71.5	2.81	71.5	2.81	72.5	2.85
(2)	12	0.5	12	0.5	15	0.6
(3)	56.5	2.2	56.5	2.2	51.5	2.03
(4)	M4 ↧ 5	M4 ↧ 0.2	M4 ↧ 5	M4 ↧ 0.2	M4 ↧ 6	M4 ↧ 0.2
(5)	41.5	1.63	41.5	1.63	29.5	1.16
(6)	Ø18g6	Ø0.7087 / 0.7082	Ø18g6	Ø0.7087 / 0.7082	Ø32g6	Ø1.2595 / 1.2589
(7)	18	0.71	36	1.42	38	1.50
(8)	20	0.79	38	1.50	43.5	1.71
(9)	8.3	0.33	8.3	0.33	8.3	0.33
(10)	111.5	4.39	147.5	5.81	159.5	6.28
(11)	14	0.6	14	0.6	14	0.6
(12)	59	2.32	59	2.32	76	2.99
(13)	Connector 12-pin		Connector 12-pin		Connector 12-pin	
(14)	20	0.79	20	0.79	29	1.14
(15)	40	1.57	40	1.57	58	2.28

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

T4 GENERAL PURPOSE ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



Dimensions (CONTINUED)

See Drawing	CAPACITIES	
	Metric (Nm)	U.S. (lbf-in)
	1K	8.85K
	mm	in
(1)	130	5.12
(2)	20	0.8
(3)	64.5	2.54
(4)	17	0.7
(5)	89	3.5
(6)	Ø50g6	Ø1.9685 / 1.9675
(7)	58 TYP	2.28 TYP
(8)	66 TYP	2.60 TYP
(9)	40	1.6
(10)	262	10.3
(11)	13	0.5
(12)	136	5.4
(13)	Connector 12-pin	
(14)	57.5	2.26
(15)	Ø115	Ø4.5

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

T4 GENERAL PURPOSE ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

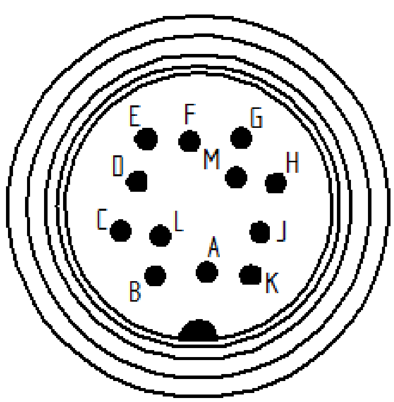
PERFORMANCE PARAMETERS

CAPACITY		MAX RPM	SPRING RATE	MOMENT OF INERTIA (kg•m²) [1]		MAX THRU.S.T LOAD [2]		MAX SHEAR FORCE [2]	
(Nm)	(lbf-in)		(NM/rad)	Drive Side	Test Side	(N)	(lbf)	(N)	(lbf)
0.1	0.88	15,000	$1.8x10^1$	$1.9x10^{-6}$	$2.8x10^{-7}$	42	9.44	0.9	0.20
0.2	1.77	15,000	$1.8x10^1$	$1.9x10^{-6}$	$2.8x10^{-7}$	58	13.0	1.2	0.27
0.5	4.43	15,000	$1.2x10^2$	$1.9x10^{-6}$	$2.8x10^{-7}$	172	38.7	1.9	0.43
1	8.85	15,000	$1.2x10^2$	$1.9x10^{-6}$	$2.8x10^{-7}$	227	51.0	2.9	0.65
2	17.7	15,000	$3.6x10^2$	$1.9x10^{-6}$	$2.9x10^{-7}$	348	78.2	5.5	1.24
5	44.3	15,000	$4.0x10^2$	$1.9x10^{-6}$	$2.9x10^{-7}$	650	146	14	3.15
10	88.5	15,000	$9.3x10^2$	$2.1x10^{-6}$	$3.8x10^{-7}$	1K	225	26	5.85
20	177	15,000	$4.5x10^3$	$1.2x10^{-5}$	$9.9x10^{-6}$	1.68K	378	43	9.67
30	265	15,000	$4.5x10^3$	$1.2x10^{-5}$	$9.9x10^{-6}$	2.2K	495	65	14.6
50	443	15,000	$8.5x10^3$	$1.3x10^{-5}$	$1.2x10^{-5}$	3.1K	697	80	18.0
100	885	12,000	$8.5x10^3$	$1.3x10^{-5}$	$1.2x10^{-5}$	4.8K	1.08K	160	36.0
200	1.77K	10,000	$6.7x10^4$	$1.0x10^{-4}$	$9.0x10^{-5}$	8K	1.80K	290	65.2
500	4.43K	10,000	$7.1x10^4$	$1.0x10^{-4}$	$9.0x10^{-5}$	14K	3.15K	700	157
1K	8.85K	8,000	$3.1x10^5$	$1.6x10^{-3}$	$1.1x10^{-3}$	23K	5.17K	900	202

Notes:
1 = Without encoder option
2 = Unsupported shaft

Electrical CONNECTION

Pin	12-PIN Electrical CONNECTION		12-PIN RS485 OPTION	
	Function	Description	Function	Description
A	NC	–	NC	–
B	Option Angle B	TTL	Option Angle B	TTL
C	Signal (+)	±5 VDC (±10 VDC)	NC	–
D	Signal (GND)	0 VDC	NC	–
E	Supply (GND)	0 VDC, TTL	Supply (GND)	0 VDC
F	Supply (+)	12-28 V	Supply (+)	12-28 VDC
G	Option Angle A	TTL	Option Angle A	TTL
H	NC	–	NC	–
J	NC	–	RS485 Option	RS485 (B)
K	Cal. Control	L < 2.0 V / H > 3.5 V	NC	–
L	NC	–	RS485 Option	RS485 (A)
M	HoU.S.ing	–	HoU.S.ing	–



* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

T5 GENERAL PURPOSE-PEDESTAL MOUNT ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 0.1 to 1K Nm (0.89 to 8.85K lbf-in)
- Speed up to 15K RPM
- ±5 VDC output
- 12-28 VDC supply
- Contactless data transmission
- Digital electronics with on-shaft shunt
- 0.2% combined error
- 10 kHz sample rate
- 12-bit resolution
- Very short overall length

Specifications

ACCURACY – (MAX ERROR)		
Combined Error – %FS		±0.2
Nonrepeatability – %FS		±0.04
Resolution – bit		12
TEMPERATURE		
Effect on Zero – %RO / °C		±0.03
Effect on Output – % / °C		±0.015
Compensated Range	°C	+5 to +45
	°F	+41 to +113
Operating Range	°C	0 to +60
	°F	+32 to +140
Storage Range	°C	-10 to +70
	°F	+14 to +158
ELECTRICAL		
Supply Voltage – VDC		12 - 28
Supply Current – mA		≤ 60
Output – VDC		±5
Bandwidth – kHz – dB		1K, -3
Sample Rate – kHz		10
Calibration Signal – %FS		100
Electrical Connection		12-pin binder series 581 (includes mate)
ENCODER OPTIONS		
Capacities	0.1 - 1K Nm	360 pulse/rev, 2-track, +5V TTL, 90° offset, quadrature encoder
	0.88 - 8.85K lbf-in	
MECHANICAL		
Safe Overload – %RO		200
Max Speed – RPM		Varies with capacity (see table)
Shaft Material		Alloy steel
HoU.S.ing Material		Aluminum

STANDARD CONFIGURATION

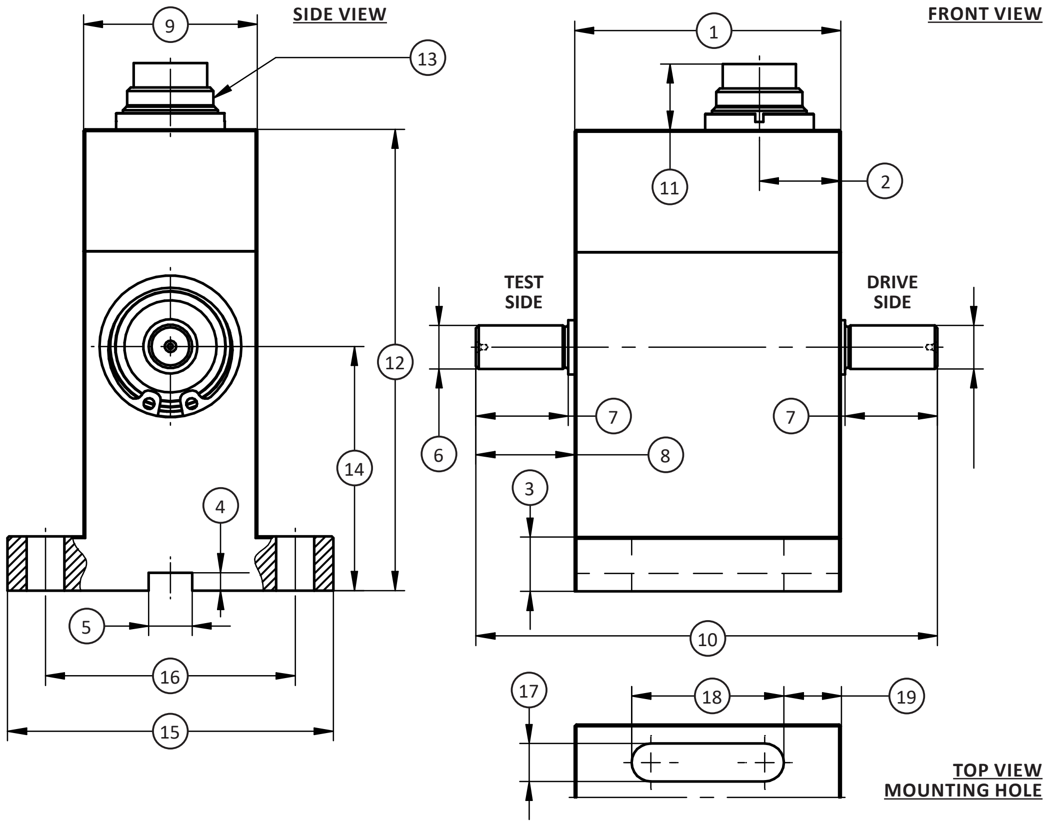
MODEL T5 (Shown)

OPTIONS

- Speed & angle measurement - 360 pulse TTL, 2-tracks 90° offset, available on capacities up to 1K Nm (8.85K lbf-in) only
- ±10V output
- RS485
- Keyed shafts - per DIN 6885.1
- Mating cable assembly

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

T5 GENERAL PURPOSE-PEDESTAL MOUNT ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

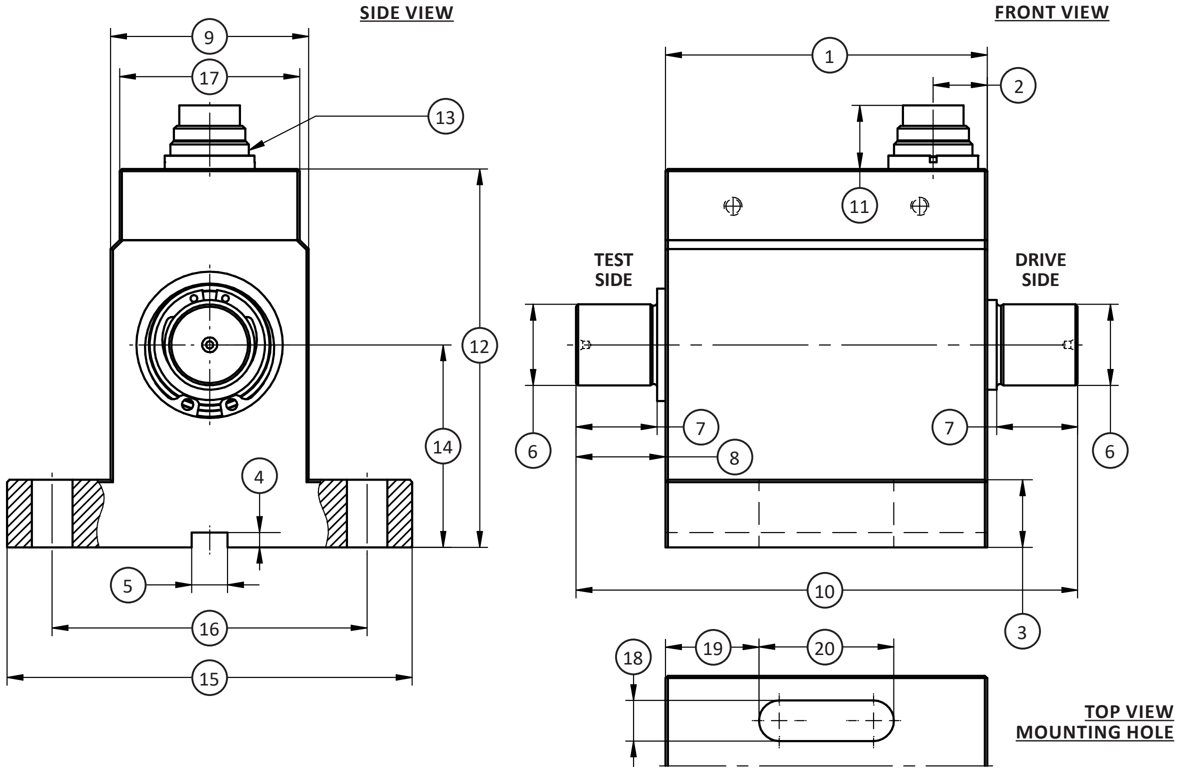


Dimensions

See Drawing	CAPACITIES	
	Metric (Nm)	U.S. (lbf-in)
	0.1, 0.2, 0.5, 1	0.89, 1.77, 4.43, 8.85
	mm	in
(1)	49	1.9
(2)	15	0.6
(3)	10	88.5
(4)	3.3	0.4
(5)	Ø 8 N9	Ø 0.3150 / 0.3135
(6)	Ø 8g6	Ø 0.3148 / 0.3144
(7)	17	0.7
(8)	18	0.7
(9)	32	1.3
(10)	85	3.3
(11)	12	0.5
(12)	85	3.3
(13)	Connector 12-pin	
(14)	45	1.8
(15)	60	2.4
(16)	46	1.8
(17)	7	0.3
(18)	28	1.1
(19)	10.5	0.4

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

T5 GENERAL PURPOSE-PEDESTAL MOUNT ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

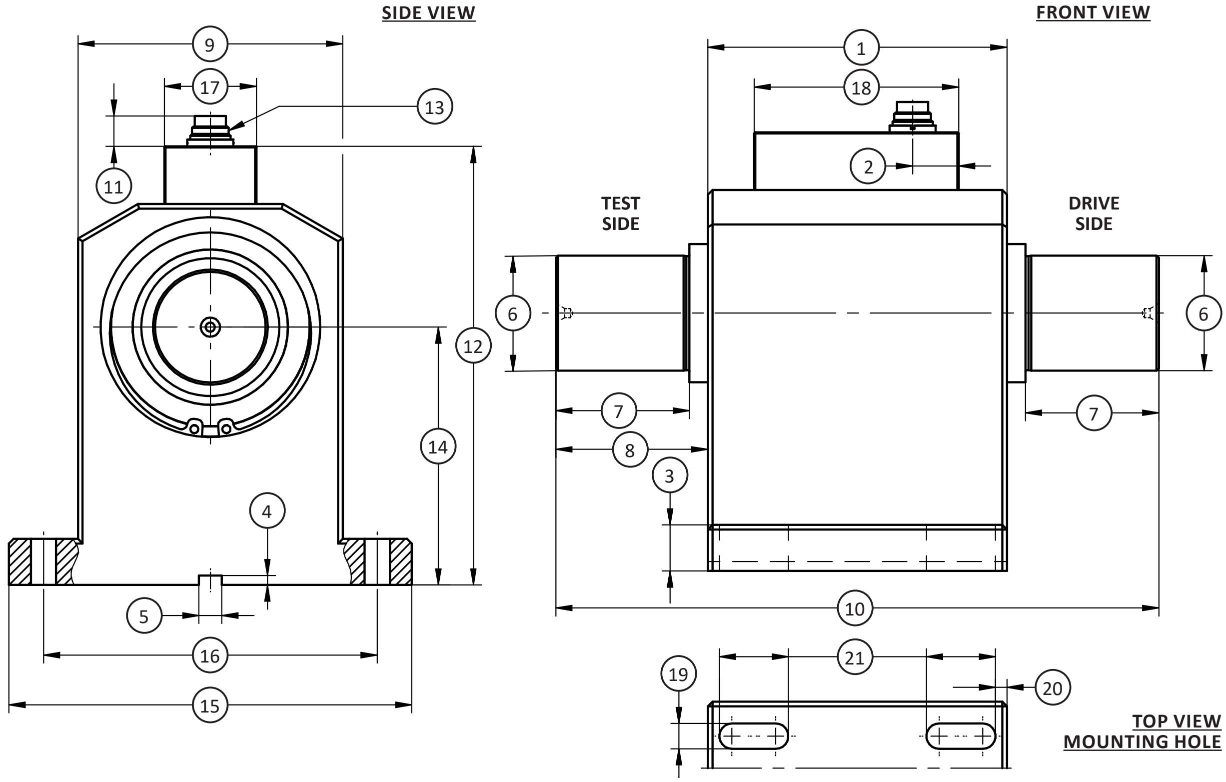


Dimensions (CONTINUED)

See Drawing	CAPACITIES							
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	2, 5	17.7, 44.3	10	8.85	20, 30	177, 265	50, 100	443, 885
	mm	in	mm	in	mm	in	mm	in
(1)	71.5	2.81	71.5	2.81	71.5	2.81	71.5	2.81
(2)	12	0.5	12	0.5	12	0.5	12	0.5
(3)	15	0.6	15	0.6	15	0.6	15	0.6
(4)	3.3	0.13	3.3	0.13	3.3	0.13	3.3	0.13
(5)	Ø 8 N9	Ø 0.3150/0.3135	Ø 8 N9	Ø 0.3150/0.3135	Ø 8 N9	Ø 0.3150/0.3135	Ø 8 N9	Ø 0.3150/0.3135
(6)	Ø8g6	Ø 0.3148/0.3144	Ø10g6	Ø 0.3935/0.3931	Ø18g6	Ø 0.7084/0.7080	Ø18g6	Ø 0.7084/0.7080
(7)	17	0.7	17	0.7	18	0.7	36	1.4
(8)	18	0.7	18	0.7	20	0.8	38	1.5
(9)	44	1.7	44	1.7	44	1.7	44	1.7
(10)	107.5	4.23	107.5	4.23	111.5	4.39	147.5	5.81
(11)	14	0.6	14	0.6	14	0.6	14	0.6
(12)	84	3.3	84	3.3	84	3.3	84	3.3
(13)	Connector 12-pin		Connector 12-pin		Connector 12-pin		Connector 12-pin	
(14)	45	1.8	45	1.8	45	1.8	45	1.8
(15)	90	3.5	90	3.5	90	3.5	90	3.5
(16)	70	2.8	70	2.8	70	2.8	70	2.8
(17)	40	1.6	40	1.6	40	1.6	40	1.6
(18)	9	0.4	9	0.4	9	0.4	9	0.4
(19)	20.75	0.817	20.75	0.817	20.75	0.817	20.75	0.817
(20)	30	1.2	30	1.2	30	1.2	30	1.2

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

T5 GENERAL PURPOSE-PEDESTAL MOUNT ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



Dimensions (CONTINUED)

See Drawing	CAPACITIES			
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	200, 500	1.77K, 4.43K	1K	8.85K
	mm	in	mm	in
(1)	130	5.1	130	5.1
(2)	20	0.8	20	0.8
(3)	20	0.8	20	0.8
(4)	4.1	0.16	4.1	0.16
(5)	Ø10 N9	Ø0.7087 / 0.7070	Ø10 N9	Ø0.7087 / 0.7070
(6)	Ø32 g6	Ø1.2595 / 1.2589	Ø50 g6	Ø1.9681 / 1.9675
(7)	38	1.5	58	2.3
(8)	43.5	1.71	66	2.6
(9)	115	4.5	115	4.5
(10)	217	8.5	262	10.3
(11)	13	0.5	13	0.5
(12)	190.4	7.50	190.4	7.50
(13)	Connector 12-pin		Connector 12-pin	
(14)	112	4.4	112	4.4
(15)	175	6.9	175	6.9
(16)	145	5.7	145	5.7
(17)	Ø40	Ø1.6	Ø40	Ø1.6
(18)	89	3.5	89	3.5
(19)	11	0.4	11	0.4
(20)	5	0.2	5	0.2
(21)	30	1.2	30	1.2

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

T5 GENERAL PURPOSE-PEDESTAL MOUNT ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

PERFORMANCE PARAMETERS

CAPACITY		MAX RPM	SPRING RATE	MOMENT OF INERTIA (Kg•m²)		MAX THRU.S.T LOAD		MAX SHEAR FORCE	
Nm	lbf-in		(NM/rad)	Drive Side	Test Side	N	lbf	N	lbf
0.1	0.88	15,000	1.8x10^{1}	1.9x10^{-6}	2.8x10^{-7}	30	6.74	0.9	0.20
0.2	1.77	15,000	1.8x10^{1}	1.9x10^{-6}	2.8x10^{-7}	30	6.74	1.2	0.27
0.5	4.43	15,000	1.2x10^{2}	1.9x10^{-6}	2.8x10^{-7}	30	6.74	2.9	0.65
1	8.85	15,000	1.2x10^{2}	2.0x10^{-6}	2.8x10^{-7}	30	6.74	2.9	0.65
2	17.7	12,000	4.4x10^{2}	1.0x10^{-5}	8.1x10^{-6}	62	13.9	8.5	1.91
5	44.3	12,000	4.4x10^{2}	1.0x10^{-5}	8.1x10^{-6}	62	13.9	8.5	1.91
10	88.5	12,000	1.7x10^{3}	1.0x10^{-5}	8.2x10^{-6}	62	13.9	28	6.29
20	177	12,000	4.5x10^{3}	1.2x10^{-5}	9.9x10^{-6}	62	13.9	43	9.67
30	265	12,000	4.5x10^{3}	1.2x10^{-5}	9.9x10^{-6}	62	13.9	65	14.6
50	443	12,000	8.5x10^{3}	1.3x10^{-5}	1.2x10^{-5}	62	13.9	64	14.4
100	885	12,000	8.4x10^{3}	1.3x10^{-5}	1.2x10^{-5}	62	13.9	64	14.4
200	1.77K	7,000	9.2x10^{4}	1.3x10^{-3}	8.0x10^{-4}	760	171	350	78.7
500	4.43K	7,000	9.2x10^{4}	1.3x10^{-3}	8.0x10^{-4}	760	171	420	94.4
1K	8.85K	7,000	3.1x10^{5}	1.6x10^{-3}	1.1x10^{-3}	760	171	800	180

1 = Without encoder option
2 = Unsupported shaft

Electrical CONNECTION

Pin	12-PIN Electrical CONNECTION		12-PIN RS485 OPTION	
	Function	Description	Function	Description
A	NC	–	NC	–
B	Option Angle B	TTL	Option Angle B	TTL
C	Signal (+)	±5 VDC (±10 VDC)	NC	–
D	Signal (GND)	0 VDC	NC	–
E	Supply (GND)	0 VDC	Supply (GND)	0 VDC
F	Supply (+)	12-28 VDC	Supply (+)	12-28 VDC
G	Option Angle A	TTL	Option Angle A	TTL
H	NC	–	NC	–
J	NC	–	RS485 Option	RS485 (B)
K	Cal. Control	L < 2.0V / H > 3.5V	NC	–
L	NC	–	RS485 Option	RS485 (A)
M	HoU.S.ing	–	HoU.S.ing	–

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

T6 DUAL RANGE ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Dual range capacities – 10:1 ratio (5/0.5 to 20K/2K Nm) (44.3/4.43 to 177K to 17.7K lbf-in)
- ±5 VDC output
- Digital electronics
- Stainless steel shaft
- 12 to 28 VDC supply
- Contactless
- 5 kHz sample rate – each range
- 16-bit

Specifications

ACCURACY – (MAX ERROR)		
Combined Error – %FS		±0.1
Nonrepeatability – %FS		±0.02
TEMPERATURE		
Effect on Zero – % RO / °C		±0.02
Effect on Output – % / °C		±0.01
Rated Range	°C	+5 to +45
	°F	+41 to +113
Operating Range	°C	0 to +60
	°F	+32 to +140
ELECTRICAL		
Output – VDC		±5
Bandwidth – kHz – dB		3 – 3
Calibration Signal – %RO		100
Speed Output – puls/rev.		60
Supply Voltage – VDC		+12 to +28
Supply Current – mA		60
Electrical Connection – pin		12
Resolution – bit		16
Sample Rate – kHz		5
MECHANICAL		
Safe Overload – %RO		200
Max Speed – RPM		Varies with capacity (see table)
Shaft Material		Stainless steel
HoU.S.ing Material		Aluminum

STANDARD CONFIGURATION

MODEL T6 (Shown)

OPTIONS

- Speed & angle measurement – 360 pulse TTL, 2-tracks 90° offset, available on capacities up to 1K Nm (8.85K lbf-in) only
- Speed output - 60 Pulse TTL, 1-track, available on capacities 2K Nm (17K lbf-in)& above
- +10V torque output
- RS485
- Keyed shafts - per Din 6885.1

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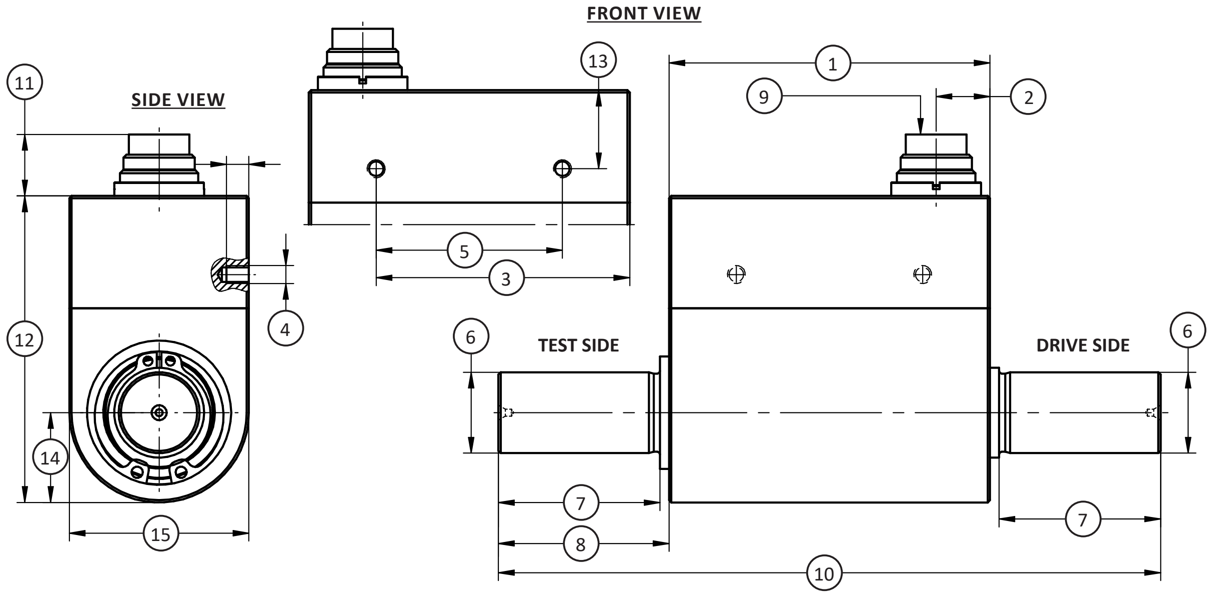
* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

T6 DUAL RANGE ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



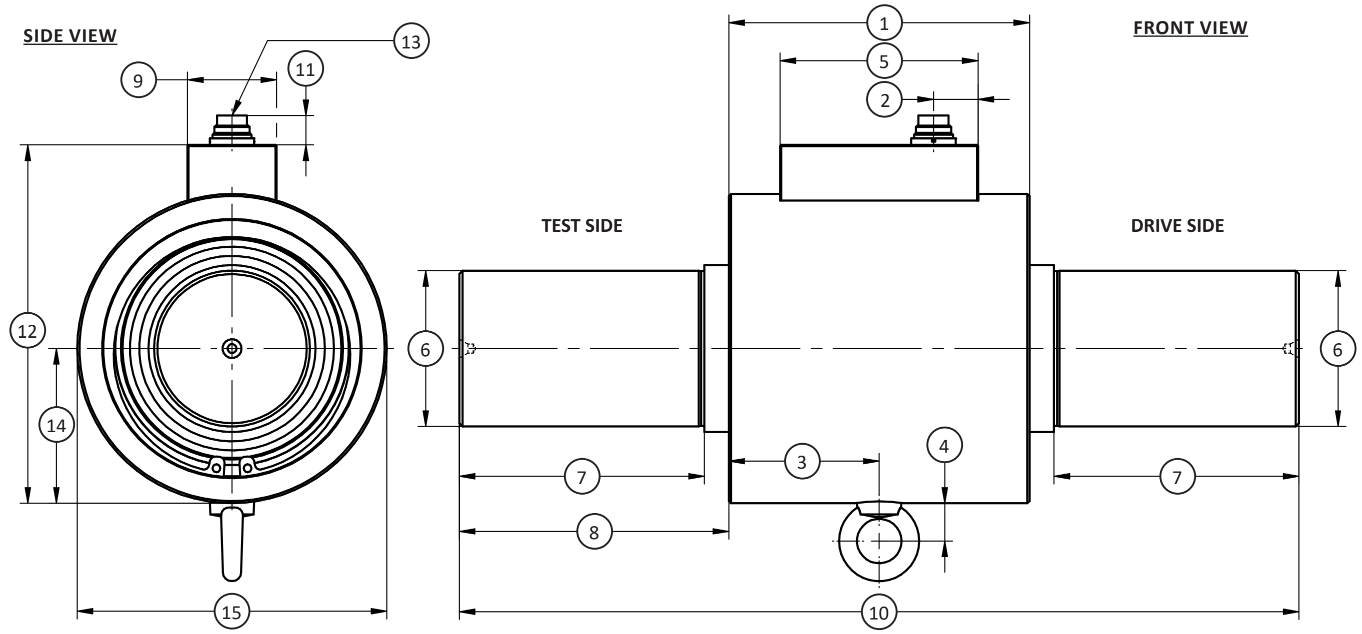
Dimensions

See Drawing	CAPACITIES									
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	5/0.5	44.3/4.43	10/1	88.5/8.85	20/2, 30/3	177/17.7, 265/26.5	50/5, 100/10	443/44.3, 885/88.5	200/20, 300/30, 500/50	1.77K/177, 2.7K/267, 4.43K/443
	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	71.5	2.81	71.5	2.81	71.5	2.81	71.5	2.81	80.5	3.17
(2)	12	0.5	12	0.5	12	0.5	12	0.5	12	0.5
(3)	56.5	2.22	56.5	2.22	56.5	2.22	56.5	2.22	55.5	2.12
(4)	2 x M4		2 x M4		2 x M4		2 x M4		2 x M4	
(5)	41.5	1.63	41.5	1.63	41.5	1.63	41.5	1.63	29.5	1.16
(6)	Ø8g6	Ø(0.3156 / 0.3150)	Ø10g6	Ø(0.3943 / 0.3937)	Ø18g6	Ø(0.7094 / 0.7087)	Ø18g6	Ø(0.7094 / 0.7087)	Ø32g6	Ø(1.2608 / 1.2598)
(7)	17	0.7	17	0.7	18	0.7	36	1.4	38	1.5
(8)	18	0.7	18	0.7	20	0.8	38	1.5	39.5	1.6
(9)	Connector 12-pin		Connector 12-pin		Connector 12-pin		Connector 12-pin		Connector 12-pin	
(10)	107.5	4.23	107.5	4.23	111.5	4.39	147.5	5.81	159.5	6.28
(11)	14	0.5	14	0.5	14	0.5	14	0.5	14	0.5
(12)	68.2	2.69	68.2	2.69	68.2	2.69	68.2	2.69	86.2	3.39
(13)	17.5	0.69	17.5	0.69	17.5	0.69	17.5	0.69	17	0.7
(14)	20	0.8	20	0.8	20	0.8	20	0.8	30.5	1.20
(15)	40	1.6	40	1.6	40	1.6	40	1.6	61	2.4

5/0.1 Nm capacity has 8 mm g6 shaft and 110/11 Nm capacity has 10 mm g6 shaft

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

T6 DUAL RANGE ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



Dimensions (CONTINUED)

See Drawing	CAPACITIES					
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	1K/100	8.85K/885	2K/200, 5K/500	17.7K/1.77K, 44.3K/4.43K	10K/1K, 20K/2K	88.5K/8.85K, 177K/17K
	mm	in	mm	in	mm	in
(1)	130	5.12	135	5.31	190	7.48
(2)	20	0.8	20	0.8	20	0.8
(3)	64.5	2.54	67.5	2.66	95	3.7
(4)	17	0.7	17	0.7	17	0.7
(5)	89	3.5	89	3.5	89	3.5
(6)	Ø50 g6 TYP	Ø(1.9695 / 1.9685) TYP	Ø70 g6 TYP	Ø(2.7571 / 2.7559) TYP	Ø110 g6 TYP	Ø(4.3321 / 4.3307) TYP
(7)	58 TYP	2.28 TYP	110 TYP	4.33 TYP	120 TYP	4.72 TYP
(8)	66 TYP	2.60 TYP	121 TYP	4.76 TYP	140 TYP	5.51 TYP
(9)	40	1.6	40	1.6	40	1.6
(10)	262	10.31	377	14.84	470	18.50
(11)	13	0.5	13	0.5	13	0.5
(12)	136	5.35	161	6.34	233	9.17
(13)	Connector 12-pin		Connector 12-pin		Connector 12-pin	
(14)	57.5	2.26	69.5	2.74	105	4.09
(15)	115	4.53	139	5.47	210	8.27

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* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

Interface
FORCE MEASUREMENT SOLUTIONS.

T6 DUAL RANGE ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

PERFORMANCE PARAMETERS

CAPACITY		MAX RPM	SPRING RATE	MOMENT OF INERTIA (Kg•m²)		MAX THRU.S.T LOAD		MAX SHEAR FORCE	
Nm	lbf-in		(NM/rad)	Drive Side	Test Side	N	lbf	N	lbf
5/0.5	44.3/4.43	15,000	$2.1x10^2$	$9.0x10^{-6}$	$8.4x10^{-6}$	450	101	3	0.67
10/1	88.5/8.85	15,000	$7.1x10^2$	$9.3x10^{-6}$	$8.5x10^{-6}$	710	160	12	2.70
20/2	177/17.7	15,000	$1.9x10^3$	$1.1x10^{-5}$	$9.9x10^{-6}$	1.15K	259	23	5.17
30/3	266/26.6	15,000	$2.9x10^3$	$1.1x10^{-5}$	$9.9x10^{-6}$	1.5K	337	35	7.87
50/5	443/44.3	15,000	$5.4x10^3$	$1.3x10^{-5}$	$1.1x10^{-5}$	2.15K	483	45	10.1
100/10	885/88.5	12,000	$8.0x10^3$	$1.3x10^{-5}$	$1.2x10^{-5}$	3.4K	764	90	20.3
200/20	1.77K/177	12,000	$3.4x10^4$	$1.1x10^{-4}$	$8.4x10^{-5}$	5.8K	1.3K	175	39.3
500/50	4.43K/443	10,000	$6.3x10^4$	$1.2x10^{-4}$	$8.6x10^{-5}$	10K	2.25K	410	92.2
1K/100	8.85/885	8,000	$2.0x10^5$	$1.6x10^{-3}$	$1.1x10^{-3}$	16.2K	3.65K	530	119
2K/200	17.7K/1.77K	5,500	$5.1x10^5$	$5.3x10^{-3}$	$4.2x10^{-3}$	25K	5.62K	720	162
5K/500	44.3K/4.43K	5,500	$7.2x10^5$	$5.3x10^{-3}$	$4.3x10^{-3}$	42K	9.44K	1850	416
10K/1K	88.5K/8.85	5,000	$3.1x10^6$	$4.1x10^{-2}$	$3.6x10^{-2}$	66K	14.8K	2700	607
20K/2K	177K/17.7K	5,000	$3.7x10^6$	$4.1x10^{-2}$	$3.7x10^{-2}$	98K	22K	5200	1.17K

Electrical CONNECTION

Pin	12-PIN Electrical CONNECTION	
	Function	Description
A	NC	–
B	Option Angle B	TTL
C	Signal (+)	±5 (±10) VDC
D	Signal (GND)	0 VDC
E	Supply (GND)	0 VDC
F	Supply (+)	12-28 V
G	Option Angle A	TTL
H	Signal 2 (+)	±5 (±10) VDC
J	NC	–
K	Cal. Control	L < 2.0V / H > 3.5V
L	NC	–
M	Shield	Transducer HoU.S.ing

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

T7 DUAL RANGE-PEDESTAL ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Dual range capacities – 10:1 ratio (5/0.5 to 20K/2K Nm) (44.3/4.43 to 177K to 17.7K lbf-in)
- ±5 VDC output
- Digital electronics
- Stainless steel shaft
- 12 to 28 VDC supply
- Contactless
- 5 kHz sample rate - each range
- 16-bit resolution

Specifications

ACCURACY – (MAX ERROR)		
Combined error – %FS		±0.1
Nonrepeatability – %FS		±0.02
TEMPERATURE		
Effect on Zero – %RO / °C		±0.02
Effect on Output – % / °C		±0.01
Rated Range	°C	+5 to +45
	°F	+41 to +113
Operating Range	°C	0 to +60
	°F	+32 to +140
ELECTRICAL		
Output – VDC		±5
Bandwidth – kHz – dB		3, 3
Calibration Signal – %RO		100
Speed Output – puls/rev.		60
Supply Voltage – VDC		+12 to +28
Supply Current – mA		60
Electrical Connection – pin		12
Resolution – bit		16
Sample Rate – kHz each range		5
MECHANICAL		
Safe Overload – %RO		200
Max Speed – RPM		Varies with capacity (see table)
Shaft Material		Stainless steel
HoU.S.ing Material		Aluminum

STANDARD CONFIGURATION

MODEL T7 (Shown)

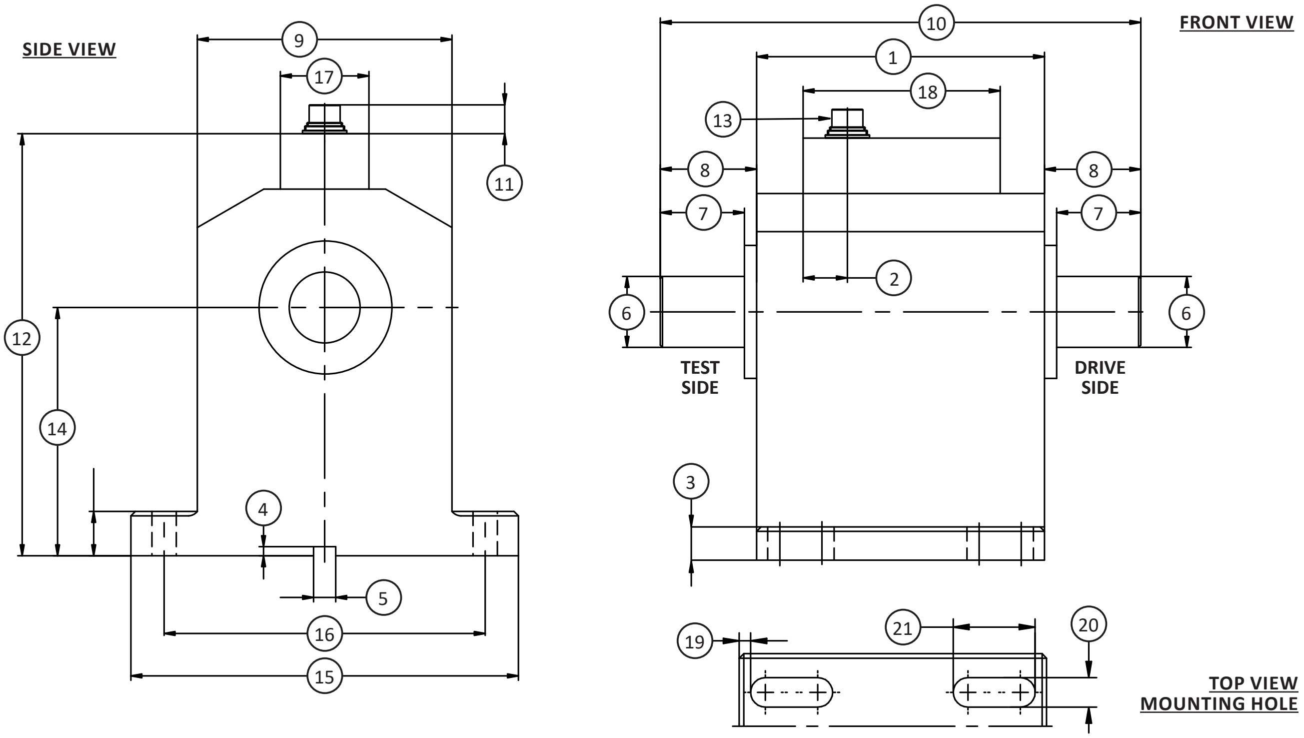
OPTIONS

- Speed & angle measurement - 360 pulse TTL, 2-tracks 90° offset, available on capacities up to 1K Nm (8.85K lbf-in) only
- Speed output - 60 pulse TTL, 1-track, available on capacities 2K Nm (17K lbf-in) & above
- +10 V torque output
- RS485
- Keyed shafts – per Din 6885.1

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

FORCE MEASUREMENT SOLUTIONS

T7 DUAL RANGE-PEDESTAL ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



Dimensions

See Drawing	CAPACITIES							
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	5/0.5	44.3/4.43	10/1	88.5/8.85	20/2, 30/3	177/17.7, 265/26.5	50/5, 100/10	443/44.3, 885/88.5
	mm	in	mm	in	mm	in	mm	in
(1)	71.5	2.81	71.5	2.81	71.5	2.81	71.5	2.81
(2)	12	0.5	12	0.5	12	0.5	12	0.5
(3)	15	0.6	15	0.6	15	0.6	15	0.6
(4)	3.3	0.13	3.3	0.13	3.3	0.13	3.3	0.13
(5)	Ø8 N9	Ø0.3150 / 0.3135	Ø8 N9	Ø0.3150 / 0.3135	Ø8 N9	Ø0.3150 / 0.3135	Ø8 N9	Ø0.3150 / 0.3135
(6)	Ø8 g6	Ø0.3148 / 0.3144	10g6	Ø0.3935 / 0.3931	18g6	Ø0.7084 / 0.7080	18g6	Ø0.7084 / 0.7080
(7)	17	0.7	17	0.7	18	0.7	36	1.4
(8)	18	0.7	18	0.7	20	0.8	38	1.5
(9)	44	1.7	44	1.7	44	1.7	44	1.7
(10)	107.5	4.23	107.5	4.23	111.5	4.39	147.5	5.81
(11)	14	0.5	14	0.5	14	0.5	14	0.5
(12)	93.3	3.67	93.3	3.67	93.3	3.67	93.3	3.67
(13)	Connector12-pin		Connector12-pin		Connector12-pin		Connector12-pin	
(14)	45	1.8	45	1.8	45	1.8	45	1.8
(15)	90	3.5	90	3.5	90	3.5	90	3.5
(16)	70	2.8	70	2.8	70	2.8	70	2.8
(17)	40	1.6	40	1.6	40	1.6	40	1.6
(18)	–		–		–		–	
(19)	20.75	0.817	20.75	0.817	20.75	0.817	20.75	0.817
(20)	9	0.4	9	0.4	9	0.4	9	0.4
(21)	21	0.8	21	0.8	21	0.8	21	0.8

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

T7 DUAL RANGE-PEDESTAL ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

Dimensions (CONTINUED)

See Drawing	CAPACITIES							
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	200/20, 500/50	1.77K/177, 4.43K/443	1K/100	8.85K/885	2K/200, 5K/500	17.7K/1.77K, 44.3K/4.43K	10K/1K, 20K/2K	88.5K/8.85K, 177k/17.7K
	mm	in	mm	in	mm	in	mm	in
(1)	130	29.2	130	29.2	135	30.3	190	42.7
(2)	20	4.5	20	4.5	20	4.5	20	4.5
(3)	20	4.5	20	4.5	25	5.6	40	9.0
(4)	4.1	0.92	4.1	0.92	4.1	0.92	4.1	0.92
(5)	Ø10 N9	Ø0.3937 / 0.3933	Ø10 N9	Ø0.3937 / 0.3933	Ø10 N9	Ø0.3937 / 0.3933	Ø10 N9	Ø0.3937 / 0.3933
(6)	Ø32 g6	Ø1.2598 / 1.2574	Ø50 g6	Ø1.9685 / 1.9661	Ø70 g6	Ø2.7559 / 2.7530	Ø110 g6	Ø4.3307 / 4.3273
(7)	38	1.5	58	2.3	110	4.3	120	4.7
(8)	43.5	1.71	66	2.6	121	4.8	140	5.5
(9)	115	4.5	115	4.5	139	5.5	210	8.3
(10)	217	8.5	262	10.3	377	14.8	470	18.5
(11)	13	0.5	13	0.5	13	0.5	13	0.5
(12)	190.4	7.50	190.4	7.50	251.5	9.90	343	13.5
(13)	Connector 12-pin		Connector 12-pin		Connector 12-pin		Connector 12-pin	
(14)	112	4.4	112	4.4	160	6.3	215	8.5
(15)	175	6.9	175	6.9	207	8.1	300	11.8
(16)	145	5.7	145	5.7	173	6.8	260	10.2
(17)	40	1.6	40	1.6	40	1.6	40	1.6
(18)	89	3.5	89	3.5	89	3.5	89	3.5
(19)	5	0.2	5	0.2	5	0.2	15	0.6
(20)	11	0.4	11	0.4	13	0.5	17	0.7
(21)	30	1.2	30	1.2	36	1.4	45	1.8

Catalog 2019 06-15-2020

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

T7 DUAL RANGE-PEDESTAL ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

PERFORMANCE PARAMETERS

CAPACITY		MAX RPM	SPRING RATE	MOMENT OF INERTIA – J (Kgxm²)		MAX THRU.S.T LOAD		MAX SHEAR FORCE	
Nm	lbf-in		(NM/rad)	Drive Side	Test Side	N	lbf	N	lbf
5/0.5	44.3/4.43	12,000	$2.4x10^{2}$	$9.7x10^{-6}$	$7.9x10^{-6}$	62	13.9	3	0.67
10/1	88.5/8.85	12,000	$7.2x10^{2}$	$1.0x10^{-5}$	$7.9x10^{-6}$	62	13.9	12	2.70
20/2	177/17.7	12,000	$1.9x10^{3}$	$1.1x10^{-5}$	$9.9x10^{-6}$	62	13.9	23	5.17
30/3	266/26.6	12,000	$2.9x10^{3}$	$1.1x10^{-5}$	$9.9x10^{-6}$	62	13.9	35	7.87
50/5	443/44.3	12,000	$5.4x10^{3}$	$1.4x10^{-5}$	$1.1x10^{-5}$	62	13.9	45	10.1
100/10	885/88.5	12,000	$8.0x10^{3}$	$1.4x10^{-5}$	$1.2x10^{-5}$	62	13.9	64	14.4
200/20	1.77K/177	7,000	$3.3x10^{4}$	$1.3x10^{-3}$	$8.0x10^{-4}$	770	173	175	39.3
500/50	4.43K/443	7,000	$7.7x10^{4}$	$1.3x10^{-3}$	$8.0x10^{-4}$	770	173	410	92.2
1K/100	8.85/885	7,000	$1.9x10^{5}$	$1.6x10^{-3}$	$1.1x10^{-3}$	770	173	530	119
2K/200	17.7K/1.77K	5,500	$5.1x10^{5}$	$5.4x10^{-3}$	$4.2x10^{-3}$	1100	247	720	162
5K/500	44.3K/4.43K	5,500	$7.8x10^{5}$	$5.5x10^{-3}$	$4.3x10^{-3}$	1100	247	860	193
10K/1K	88.5K/8.85	3,500	$2.9x10^{6}$	$4.1x10^{-2}$	$3.6x10^{-2}$	2800	629	2400	540
20K/2K	177K/17.7K	3,500	$3.8x10^{6}$	$4.1x10^{-2}$	$3.7x10^{-2}$	2800	629	2400	540

Electrical CONNECTION

Pin	12-PIN DUAL RANGE	
	Function	Description
A	NC	–
B	Option Angle B, option	5 VDC TTL
C	Signal 1 (+)	±5 (±10) VDC
D	Signal (GND)	0 VDC
E	Supply (GND)	0 VDC
F	Supply (+)	12-28 VDC
G	Option Angle A, option	5 VDC TTL
H	Signal 2 (+)	±5 (±10) VDC
J	NC	–
K	Cal. Control	L < 2.0V / H > 3.5V
L	NC	–
M	Shield	Transducer hoU.S.ing

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

FORCE MEASUREMENT SOLUTIONS.

T8 ECO ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 0.2 to 200 Nm (1.77 to 1.77K lbf-in)
- Stainless steel shaft
- ±5 VDC output
- 12 to 28 VDC supply
- Contactless

Specifications

ACCURACY – (MAX ERROR)		
Combined Error – %FS		±0.25
Nonrepeatability – %FS		±0.05
TEMPERATURE		
Effect on Zero – %RO / °C		±0.04
Effect on Output – % / °C		±0.02
Rated Range	°C	+5 to +45
	°F	+41 to +113
Operating Range	°C	0 to +60
	°F	+32 to +140
ELECTRICAL		
Output – VDC		±5
Bandwidth – kHz – dB		1 – 3
Supply Voltage – VDC		+12 to +28
Supply Current – mA		90
Resolution		Analog
MECHANICAL		
Safe Overload – %RO		180
Max Speed – RPM		Varies with capacity (see table)
Cable Length	m	1
	ft	3
Shaft Material		Stainless steel
HoU.S.ing Material		Aluminum

STANDARD CONFIGURATION

MODEL T8 (Shown)

OPTIONS

- Keyed shafts – per Din 6885.1

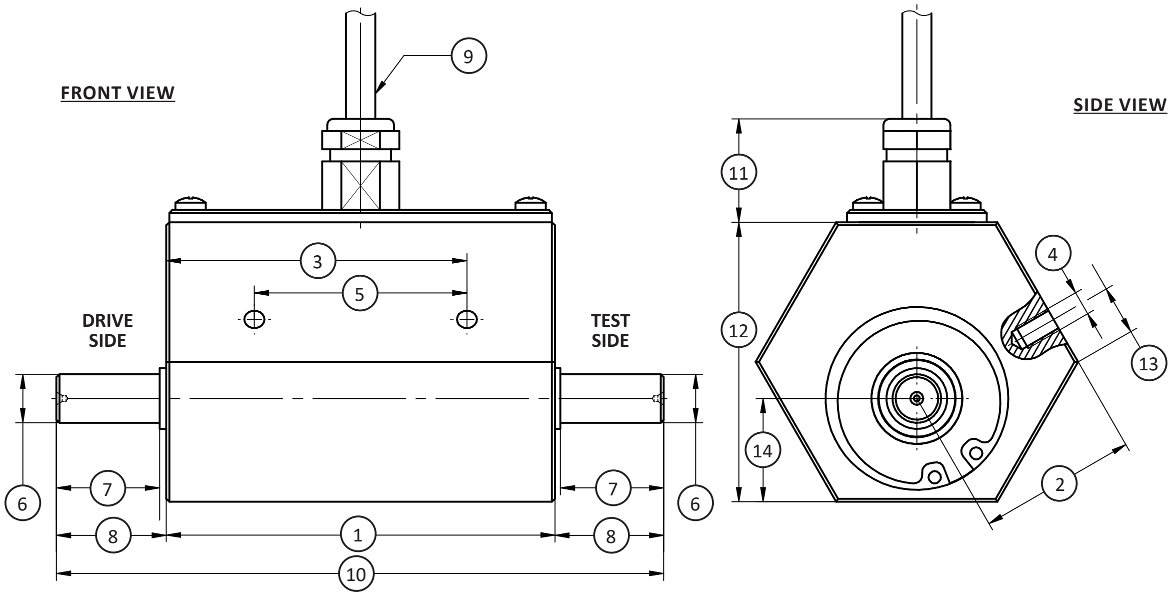
T8 INTEGRAL CABLE Wiring CODE		
Function	**Description**	**Color**
Supply (+)	+12 to +28 VDC	Brown
Supply (GND)	0 VDC	Green
Signal (+)	±5 VDC (+10 VDC)	Yellow
Signal (GND)	0 VDC	White
Shield	Shield	Shield

PERFORMANCE PARAMETERS

CAPACITY		MAX RPM	SPRING RATE	MOMENT OF INERTIA (Kg•m²)		MAX THRU.S.T LOAD		MAX SHEAR FORCE	
Nm	lbf-in		(NM/rad)	Drive Side	Test Side	N	lbf	N	lbf
0.2	1.77	10,000	1.8×10^{1}	1.6×10^{-6}	1.0×10^{-6}	58	13	1.5	0.34
0.5	4.43	10,000	1.1×10^{2}	1.6×10^{-6}	1.0×10^{-6}	185	41.6	2.1	0.47
1	8.85	10,000	2.2×10^{2}	1.6×10^{-6}	1.1×10^{-6}	340	76.4	5.1	1.15
2	17.7	10,000	2.1×10^{2}	1.6×10^{-6}	1.1×10^{-6}	340	76.4	5.1	1.15
5	44.3	10,000	8.9×10^{2}	1.7×10^{-6}	1.1×10^{-6}	1.05K	236	29	6.52
10	88.5	10,000	8.9×10^{2}	1.7×10^{-6}	1.1×10^{-6}	1.05K	236	29	6.52
20	177	8,000	8.4×10^{3}	4.2×10^{-5}	2.1×10^{-5}	2.6K	585	98	22.0
50	443	8,000	8.4×10^{3}	4.2×10^{-5}	2.1×10^{-5}	2.6K	585	98	22.0
100	885	8,000	2.0×10^{4}	4.7×10^{-5}	2.7×10^{-5}	6.4K	1.44K	250	56.2
200	1.77K	8,000	2.0×10^{4}	4.7×10^{-5}	2.7×10^{-5}	6.4K	1.44K	250	56.2

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

T8 ECO ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



Dimensions

See Drawing	CAPACITIES							
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	0.2, 0.5, 1, 2	1.77, 4.43, 8.85, 17.7	5, 10	44.3, 88.5, 133	20, 50	177, 443	100, 200	885, 1.77K
	mm	in	mm	in	mm	in	mm	in
(1)	82	3.2	82	3.2	110	4.3	120	4.7
(2)	26	1.02	26	1.02	34.8	1.37	34.8	1.37
(3)	49.5	1.95	49.5	1.95	60	2.4	60	2.4
(4)	M4		M4		M5		M5	
(5)	35	1.38	35	1.38	40	1.57	40	1.57
(6)	Ø8g6	Ø0.3148/0.3144	Ø10g6	Ø0.3935/0.3931	Ø18g6	Ø0.7087/0.7082	Ø22g6	Ø0.8659/0.8654
(7)	17	0.67	17	0.67	29	1.14	39	1.53
(8)	18	0.71	18	0.71	30	1.18	40	1.57
(9)	Ø4.8	Ø0.19	Ø4.8	Ø0.19	Ø4.8	Ø0.19	Ø4.8	Ø0.19
(10)	100	3.94	100	3.94	140	5.51	160	6.30
(11)	17	0.67	17	0.67	17	0.67	17	0.67
(12)	⬡46	⬡1.81	⬡46	⬡1.81	⬡65	⬡2.56	⬡65	⬡2.56
(13)	8	0.31	8	0.31	15	0.59	15	0.59
(14)	17	0.67	17	0.67	28	1.1	28	1.1

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

T11 BEARINGLESS ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

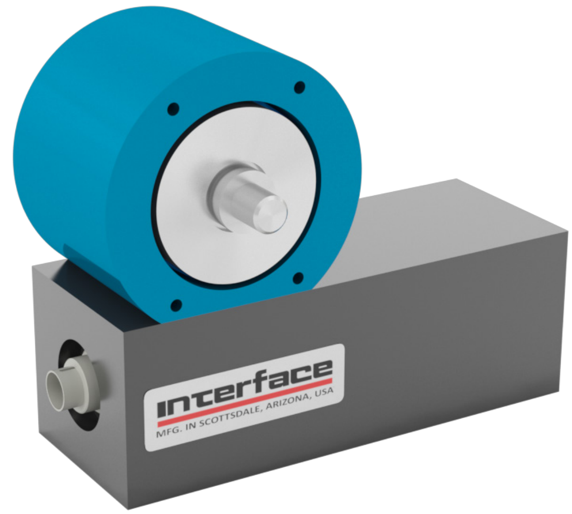
FEATURES & BENEFITS

- Capacities from 0.005 to 150 Nm (0.04 to 1.33K lbf-in)
- Bearingless
- High speed – to 30K RPM
- ±5 VDC output
- Very low range
- Eliminates bearing friction effects
- 10 kHz sample rate
- 12 to 28 VDC supply
- 16-bit resolution

Specifications

ACCURACY – (MAX ERROR)		
Combined Error – %FS		±0.1
Nonrepeatability – %FS		±0.02
TEMPERATURE		
Effect on Zero – %RO / °C		±0.02
Effect on Output – % / °C		±0.01
Rated Range	°C	+5 to +45
	°F	+41 to +113
Operating Range	°C	0 to +60
	°F	+32 to +140
ELECTRICAL		
Output – VDC		±5
Bandwidth – kHz – dB		3 – 3
Calibration Signal – %RO		100
Supply Voltage – VDC		+12 to +28
Supply Current – mA		60
Electrical Connection – pin		8
Resolution – bit		16
Sample Rate – kHz		10
MECHANICAL		
Safe Overload – %RO		200
Max Speed – RPM		30K (see table)
Shaft Material		Stainless steel
HoU.S.ing Material		Aluminum

STANDARD CONFIGURATION



MODEL T11 (Shown)

OPTIONS

- +10 VDC output
- Speed output – 6 Pulse TTL, 1-track

Electrical CONNECTION

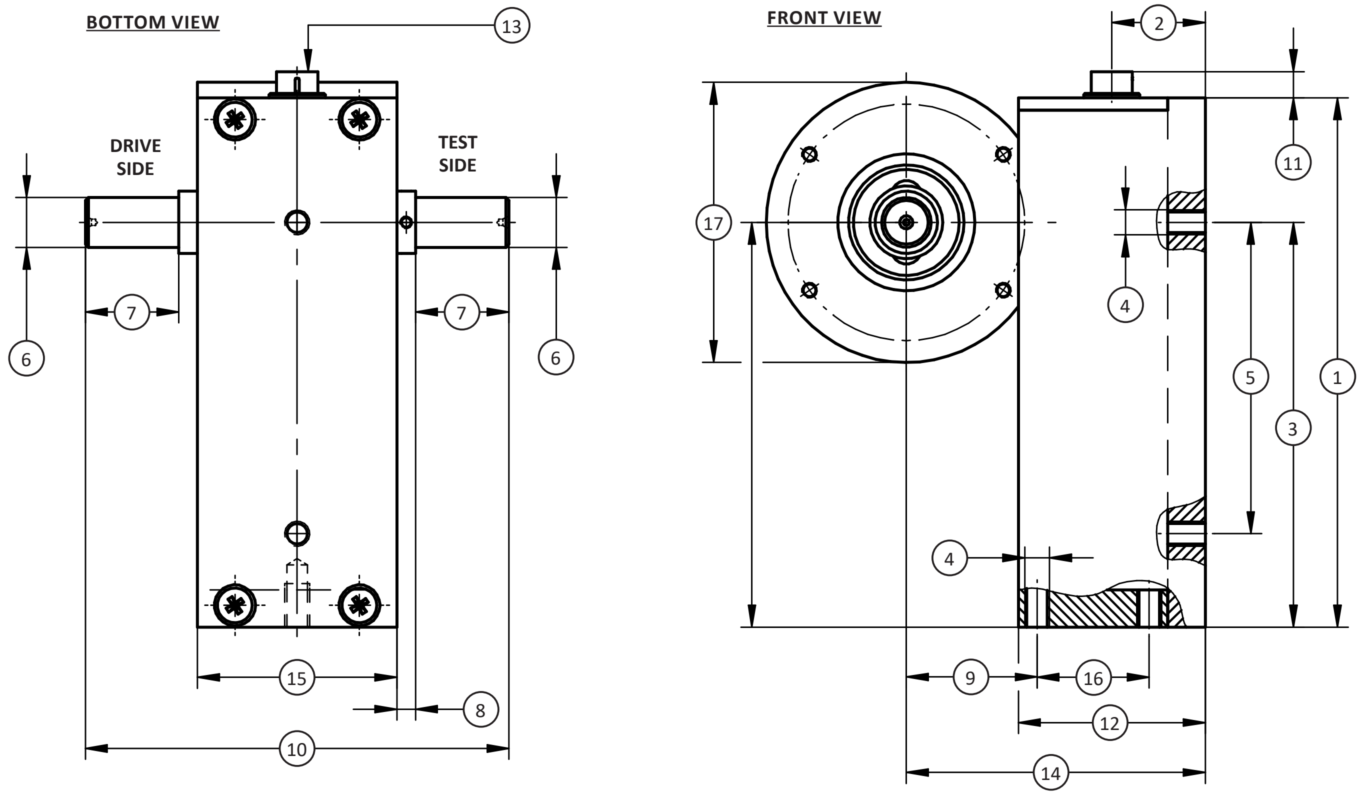
Pin	8-PIN Electrical CONNECTION	
	Function	**Description**
1	Supply (+)	12-28 V
2	Supply (GND)	0 VDC
3	Signal (+)	±5 (±10)VDC
4	Signal (GND)	0 VDC
5	Cal. Control	L < 2.0V / H > 3.5V
6	Option Angle A	5VDC TTL
7	NC	–
8	NC	–
	HoU.S.ing	Shield

Catalog 2019 06-15-2020

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

interface
FORCE MEASUREMENT SOLUTIONS.

T11 BEARINGLESS ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



Dimensions

See Drawing	CAPACITIES									
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	0.005, 0.01	0.04, 0.62	0.02, 0.05, 0.1, 0.2, 0.5, 1	0.18, 0.44, 0.85, 1.77, 4.43, 8.85	2, 5	17.7, 44.3	10	88.5	20, 50, 100, 150	177, 443, 885, 1.33K
	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	85	3.3	85	3.3	85	3.3	85	3.3	85	3.3
(2)	15	0.6	15	0.6	15	0.6	15	0.6	15	0.6
(3)	65	2.6	65	2.6	65	2.6	65	2.6	65	2.6
(4)	M4		M4		M4		M4		M4	
(5)	50	2.0	50	2.0	50	2.0	50	2.0	50	2.0
(6)	4g6	0.1573/0.1570	6g6	0.2361/0.2357	8g6	0.3148/0.3144	10g6	0.3935/0.3931	18g6	0.7084/0.7080
(7)	5	0.20	7	0.28	15	0.59	15	0.59	36	1.42
(8)	3	0.1	3	0.1	3	0.1	3	0.1	9	0.4
(9)	21	0.8	21	0.8	21	0.8	21	0.8	21	0.8
(10)	48	1.89	52	2.05	68	2.68	68	2.68	122	4.80
(11)	4	0.2	4	0.2	4	0.2	4	0.2	4	0.2
(12)	30	1.2	30	1.2	30	1.2	30	1.2	30	1.2
(13)	Connector 8-pin		Connector 8-pin		Connector 8-pin		Connector 8-pin		Connector 8-pin	
(14)	48	1.89	48	1.89	48	1.89	48	1.89	53	2.09
(15)	32	1.3	32	1.3	32	1.3	32	1.3	32	1.3
(16)	18	0.7	18	0.7	18	0.7	18	0.7	18	0.7
(17)	45	1.77	45	1.77	45	1.77	45	1.77	59.5	2.34

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

T11 BEARINGLESS ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

PERFORMANCE PARAMETERS

CAPACITY		MAX RPM	SPRING RATE	MOMENT OF INERTIA – (Kg•m²)		MAX THRU.S.T LOAD		MAX SHEAR FORCE	
Nm	lbf-in		NM/rad	Drive Side	Test Side	N	lbf	N	lbf
0.005	0.04	20,000	$4.6x10^{-1}$	$7.5x10^{-7}$	$1.1x10^{-8}$	35	7.9	1	0.22
0.01	0.09	20,000	$4.6x10^{-1}$	$7.5x10^{-7}$	$1.1x10^{-8}$	35	7.9	1	0.22
0.02	0.18	30,000	$3.7x10^{0}$	$7.6x10^{-7}$	$1.3x10^{-8}$	35	7.9	1	0.22
0.05	0.44	30,000	$3.7x10^{0}$	$7.6x10^{-7}$	$1.3x10^{-8}$	40	9.0	1.1	0.25
0.1	0.89	30,000	$1.8x10^{1}$	$8.6x10^{-7}$	$3.8x10^{-8}$	43	10.0	1.5	0.34
0.2	1.77	30,000	$1.8x10^{1}$	$8.6x10^{-7}$	$3.8x10^{-8}$	59	13.3	2.3	0.52
0.5	4.43	30,000	$1.2x10^{2}$	$8.6x10^{-7}$	$3.8x10^{-8}$	185	41.6	4.2	0.94
1	8.85	30,000	$1.2x10^{2}$	$8.6x10^{-7}$	$3.8x10^{-8}$	255	57.3	7.2	1.62
2	17.7	30,000	$6.2x10^{2}$	$9.1x10^{-7}$	$8.3x10^{-8}$	520	117	14	3.15
5	44.3	30,000	$6.2x10^{2}$	$9.1x10^{-7}$	$8.3x10^{-8}$	520	117	14	3.15
10	88.5	30,000	$1.5x10^{3}$	$9.8x10^{-7}$	$1.6x10^{-7}$	900	202	33	7.42
20	177	20,000	$7.4x10^{3}$	$1.2x10^{-5}$	$3.6x10^{-6}$	2.15K	483	62	13.9
50	443	20,000	$1.1x10^{4}$	$1.2x10^{-5}$	$3.9x10^{-6}$	4K	899	160	36.0
100	885	20,000	$1.1x10^{4}$	$1.2x10^{-5}$	$3.9x10^{-6}$	4K	899	160	36.0
150	1.33K	20,000	$1.2x10^{4}$	$1.2x10^{-5}$	$4.2x10^{-6}$	5K	1.12K	220	49.5

FORCE MEASUREMENT SOLUTIONS.

T12 SQUARE DRIVE TORQUE TRANSDUCER (U.S. & METRIC)

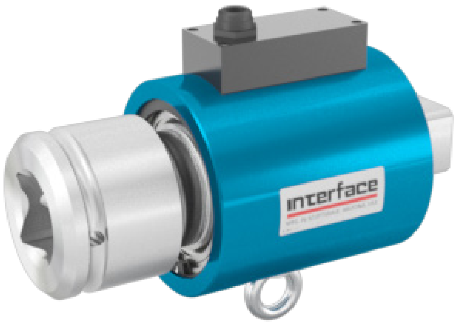
FEATURES & BENEFITS

- Capacities from 0.1 to 5K Nm (0.89 to 44.3K lbf-in)
- ±5 VDC output
- 12 to 28 VDC supply
- Contactless - no slip rings

Specifications

		Standard	Enhanced
ACCURACY – (MAX ERROR)			
Combined Error – %FS		±0.25	±0.1
Nonrepeatability – %FS		±0.05	±0.02
TEMPERATURE			
Effect on Zero – %RO / °C		±0.05	±0.02
Effect on Output – % / °C		±0.02	±0.01
Rated Range	°C	+5 to +45	+5 to +45
	°F	+41 to +113	+41 to +113
Operating Range	°C	0 to +60	0 to +60
	°F	+32 to +140	+32 to +140
ELECTRICAL			
Torque Output – VDC		±5	±5
Bandwidth – kHz – dB		1 – 3	3 – 3
Calibration Signal – %RO		100	100
Supply Voltage – VDC		+12 to +28	+12 to +28
Supply Current – mA		60	60
Electrical Connection – pin		8 or 12	8 or 12
Resolution – bit		12	16
Sample Rate – kHz		10	10
MECHANICAL			
Safe Overload – %RO		200	200
Max Speed – RPM		Varies with capacity (see table)	Varies with capacity (see table)
HoU.S.ing Material		Aluminum	Aluminum

STANDARD CONFIGURATION



MODEL T12 (Shown)

OPTIONS

- Angle measurement - 360 pulse TTL, 2-tracks 90° offset, available on capacities up to 1K Nm only
- +10 V torque output
- Enhanced accuracy – combined error ±0.1%
- RS485 output (requires enhanced accuracy)

ELECTRICAL CONNECTION

Pin	12-PIN Electrical CONNECTION		12-PIN RS485 OPTION	
	Function	Description	Function	Description
A	NC	–	NC	–
B	Option Angle B	TTL	Option Angle B	TTL
C	Signal (+)	±5 VDC	NC	–
D	Signal (GND)	0 VDC	NC	–
E	Supply (GND)	0 VDC	Supply (GND)	0 VDC
F	Supply (+)	12-28 V	Supply (+)	12-28 VDC
G	Option Angle A	TTL	Option Angle A	TTL
H	NC	–	NC	–
J	NC	–	RS485 Option	RS485 (B)
K	Cal. Control	L< 2.0 / H > 3.5V	NC	–
L	NC	–	RS485 Option	RS485 (A)
M	HoU.S.ing	–	HoU.S.ing	–

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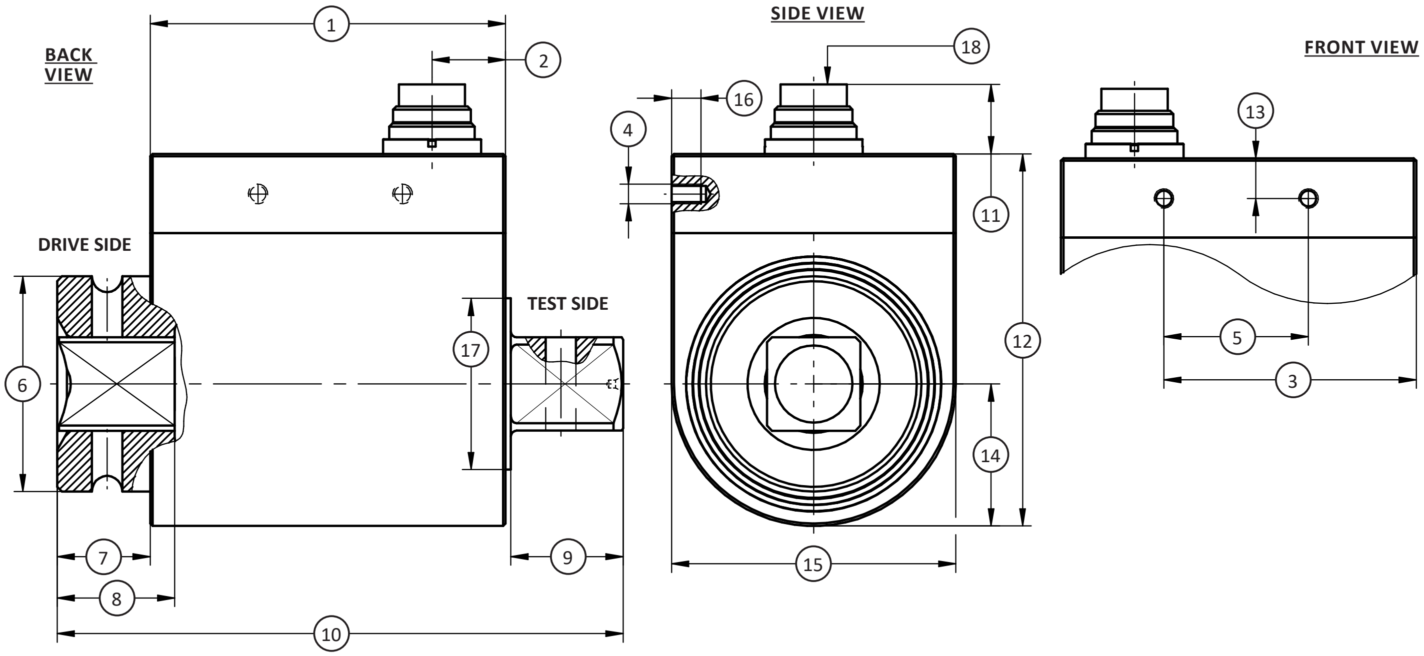
FORCE MEASUREMENT SOLUTIONS

T12 SQUARE DRIVE TORQUE TRANSDUCER (U.S. & METRIC)

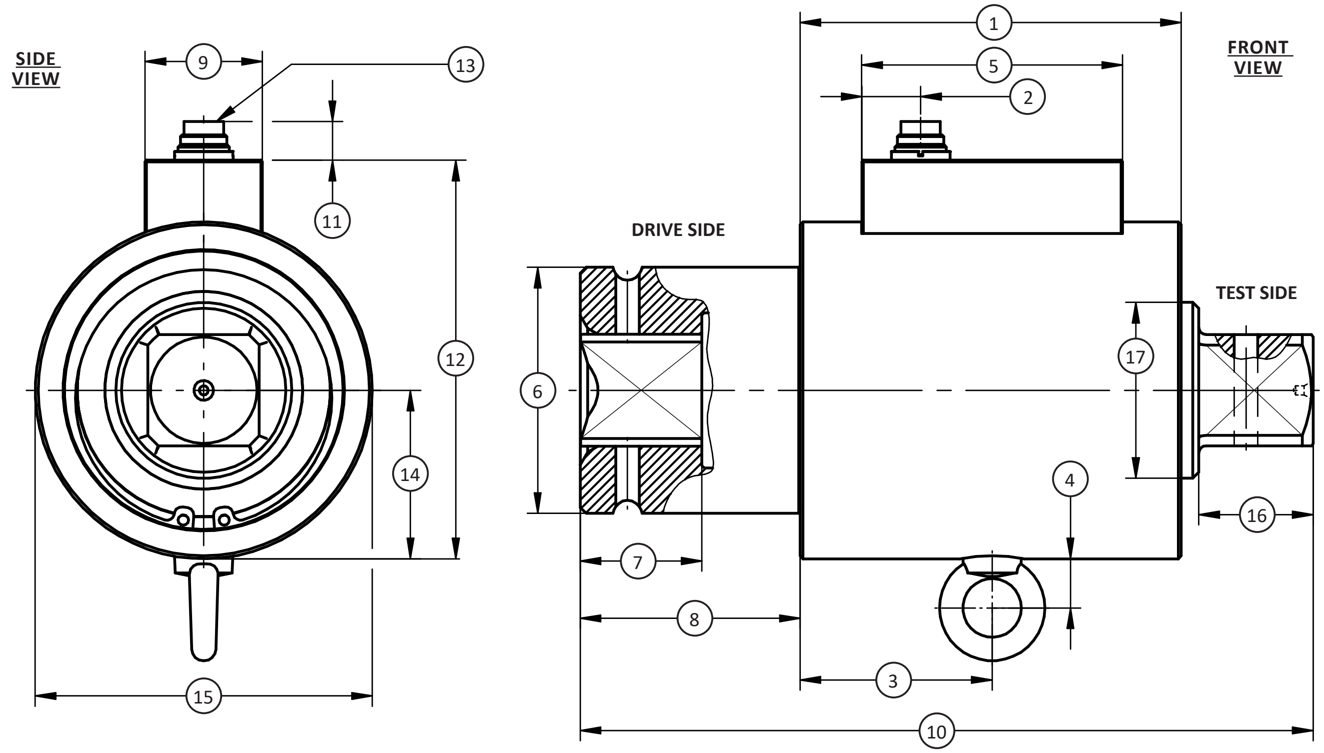


Dimensions

See Drawing	CAPACITIES									
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	0.1, 0.2, 0.5, 1, 2, 5, 10, 15, 20	0.85, 1.77, 4.43, 8.85, 17.7, 44.3, 88.5, 133, 177	35, 50, 63	310, 442, 558	100, 160, 200	885, 1.41K, 1.77K	500	2.26K, 4.43K	1K	8.85K
	1/4"		3/8"		1/2"		3/4"		1"	
	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	49	1.9	71.5	2.82	71.5	2.82	72.5	2.86	72.5	2.86
(2)	15	0.6	12	0.47	29.8	1.17	15	0.6	15	0.6
(3)	33.5	1.3	56.5	2.22	56.5	2.22	51.5	2.03	51.5	2.03
(4)	M4		M4		M4		M4		M4	
(5)	18	0.7	41.5	1.64	41.5	1.64	29.5	1.16	29.5	1.16
(6)	Ø13	Ø0.5	Ø22	Ø0.87	Ø29.8	Ø1.17	Ø44	Ø1.7	Ø54	Ø2.1
(7)	6.5	0.3	11	0.43	13	0.51	19	0.75	29	1.14
(8)	8	0.3	–	–	–	–	24	0.9	26.5	1.04
(9)	7.2	0.3	10.4	0.41	15.1	0.61	22.9	0.90	27.4	1.08
(10)	64	2.5	94.5	3.72	100.5	3.96	115.5	4.55	130.5	5.14
(11)	12	0.5	14	0.6	14	0.6	14	0.6	14	0.6
(12)	56	2.2	59	2.32	59	2.32	76	2.99	76	2.99
(13)	26.5	1.0	8.2	0.32	8.2	0.32	8.2	0.32	8.2	0.32
(14)	16	0.6	20	0.79	20	0.79	29	1.14	29	1.14
(15)	32	1.3	40	1.58	40	1.58	58	2.29	58	2.29
(16)	4	0.2	5	0.2	5	0.2	6	0.24	6	0.24
(17)	Ø10	Ø0.4	Ø20	Ø0.8	Ø20	Ø0.8	Ø35	Ø1.4	Ø35	Ø1.4
(18)	Connector 12-pin		Connector 12-pin		Connector 12-pin		Connector 12-pin		Connector 12-pin	

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

T12 SQUARE DRIVE TORQUE TRANSDUCER (U.S. & METRIC)



Dimensions (CONTINUED)

See Drawing	CAPACITIES	
	Metric (Nm)	U.S. (lbf-in)
	2K, 5K	17K, 44.3 K
	1 1/2"	
	mm	in
(1)	130	5.1
(2)	20	0.8
(3)	65.5	2.6
(4)	17	0.7
(5)	89	3.5
(6)	Ø84	Ø3.3
(7)	41.5	1.6
(8)	75	3.0
(9)	40	1.6
(10)	250	9.8
(11)	13	0.5
(12)	136	5.4
(13)	Connector 12-pin	
(14)	57.5	2.3
(15)	Ø115	Ø4.5
(16)	39	1.5
(17)	Ø60	Ø2.4

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

FORCE MEASUREMENT SOLUTIONS.

T12 SQUARE DRIVE TORQUE TRANSDUCER (U.S. & METRIC)

PERFORMANCE PARAMETERS

CAPACITY		SQUARE	MAX RPM	SPRING RATE	MOMENT OF INERTIA – J ($Kg•m^2$)		MAX THRU.S.T LOAD		MAX SHEAR FORCE	
Nm	lbf-in	in		NM/rad	Drive Side	Test Side	N	lbf	N	lbf
0.1	0.88	1/4	3,000	$1.8x10^{1}$	$2.1x10^{-6}$	$2.3x10^{-7}$	42	9.4	1.2	0.27
0.2	1.77	1/4	3,000	$1.8x10^{1}$	$2.1x10^{-6}$	$2.3x10^{-7}$	42	9.4	1.2	0.27
0.5	4.43	1/4	3,000	$1.2x10^{2}$	$2.1x10^{-6}$	$2.3x10^{-7}$	185	41.6	2.9	0.65
1	8.85	1/4	3,000	$1.2x10^{2}$	$2.1x10^{-6}$	$2.3x10^{-7}$	260	58.5	4.7	1.06
2	17.7	1/4	4,000	$3.0x10^{2}$	$2.1x10^{-6}$	$2.4x10^{-7}$	480	108	12.2	2.74
5	44.3	1/4	4,000	$5.9x10^{2}$	$2.1x10^{-6}$	$2.5x10^{-7}$	870	196	30	6.74
10	88.5	1/4	4,000	$7.3x10^{2}$	$2.1x10^{-6}$	$2.7x10^{-7}$	1.15K	259	45	10.1
15	133	1/4	4,000	$7.3x10^{2}$	$2.1x10^{-6}$	$2.7x10^{-7}$	1.15K	259	45	10.1
20	177	1/4	4,000	$7.3x10^{2}$	$2.1x10^{-6}$	$2.7x10^{-7}$	1.15K	259	45	10.1
35	310	3/8	3,000	$8.6x10^{3}$	$9.8x10^{-6}$	$1.1x10^{-5}$	3.3K	742	110	24.7
50	443	3/8	3,000	$1.0x10^{4}$	$9.9x10^{-6}$	$1.1x10^{-5}$	4.2K	944	155	34.8
63	558	3/8	3,000	$1.1x10^{4}$	$1.0x10^{-5}$	$1.1x10^{-5}$	4.9K	1.1K	190	42.7
100	885	1/2	2,500	$1.2x10^{4}$	$1.6x10^{-5}$	$1.1x10^{-5}$	4K	899	135	30.3
160	1.42K	1/2	2,500	$1.5x10^{4}$	$1.6x10^{-5}$	$1.2x10^{-5}$	5.5K	1.24K	215	48.3
200	1.77K	1/2	2,500	$1.5x10^{4}$	$1.6x10^{-5}$	$1.2x10^{-5}$	5.5K	1.24K	215	48.3
500	4.43K	3/4	2,500	$8.8x10^{4}$	$9.8x10^{-5}$	$7.7x10^{-5}$	13.5K	3.03K	840	189
1K	8.85K	1	1,500	$1.3x10^{5}$	$2.1x10^{-4}$	$1.1x10^{-4}$	16.5K	3.71K	1K	225
2K	17.7K	1 1/2	1,000	$2.1x10^{5}$	$3.5x10^{-3}$	$1.8x10^{-3}$	27K	6.07K	1.65K	371
5K	44.3K	1 1/2	1,000	$2.7x10^{5}$	$3.5x10^{-3}$	$1.8x10^{-3}$	51K	11.5K	4K	899

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

T14 SLIP-RING ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 1 to 500 Nm (8.85 to 4.4K lbf-in)
- Integrated speed and angle measurement option
- Keyed shaft
- mV/V output
- Small, compact size
- 360 pulse speed and angle measurement

Specifications

ACCURACY – (MAX ERROR)		
Combined error – %FS		±0.1
Nonrepeatability – %		±0.05
TEMPERATURE		
Effect on zero – %RO / °C		±0.02
Effect on output – % / °C		±0.01
Rated range	°C	+5 to +50
	°F	+41 to +122
Operating range	°C	-10 to +60
	°F	+14 to +140
ELECTRICAL		
Output – VDC	1 Nm	±0.5
	8.85 lbf-in	
	2 - 500 Nm	±1.0
	17.7 - 4.43K lbf-in	
Bridge resistance – Ohm		350
Electrical connection – pin		6
MECHANICAL		
Safe overload – %RO		150
Shaft material		Alloy steel
HoU.S.ing material		Aluminum

STANDARD CONFIGURATION

MODEL T14 (Shown)

BRU.S.H LIFE

Speed (rpm)	CAPACITY					
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	1, 2, 5, 10	**8.85, 17.7, 44.3, 88.5**	**20, 50, 100**	**177, 443, 885**	**200, 500**	**1.77K, 4.43K**
10	10 years		7.6 years		5.7 years	
100	138 days		62 days		55 days	
500	233 hours		166 hours		100 hours	
1000	83 hours		50 hours		33 hours	
1500	44 hours		27 hours		-	
2000	25 hours		-		-	

ELECTRICAL CONNECTION

Pin	T14 12-Pin with Encoder	
	Function	**Description**
A	Excitation (-)	0 V
B	Excitation (+)	2-12 V
C	Signal (+)	+ Output
D	Signal (-)	- Output
E	Excitation Angle	0 V
F	Excitation Angle	+5 V
G	Angle A	TTL
H	Angle B	TTL
J	Angle	0 V
K	100% R-Cal Option	Connect to Pin B
L	NC	–
M	Shield	–

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

T14 SLIP-RING ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

PERFORMANCE PARAMETERS

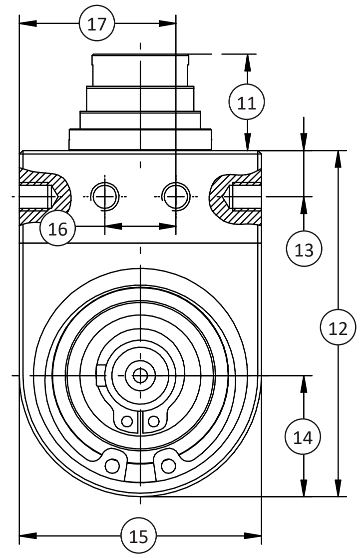
CAPACITY		MAX RPM MIN*1	SPRING RATE	MOMENT OF INERTIA – J (Kg•m^2)*1		MAX THRU.S.T LOAD*2		MAX SHEAR LOAD*2	
Nm	lbf-in		NM/rad	Drive Side	Test Side	N	lbf	N	lbf
1	8.85	2,000	2.2x10^2	3.5x10^{-6}	3.5x10^{-6}	380	85.4	4.5	1
2	17.7	2,000	2.2x10^2	3.5x10^{-6}	3.5x10^{-6}	380	85.4	4.5	1
5	44.3	2,000	5.6x10^2	3.5x10^{-6}	3.5x10^{-6}	690	155	11	2.5
10	88.5	2,000	6.5x10^2	3.5x10^{-6}	3.5x10^{-6}	780	175	13	2.9
20	177	1,500	3.4x10^3	1.1x10^{-5}	1.1x10^{-5}	1,750	393	31	7
50	443	1,500	8.2x10^3	1.2x10^{-5}	1.2x10^{-5}	3,300	742	80	18
100	885	1,500	1.3x10^4	1.4x10^{-5}	1.4x10^{-5}	5,200	1.17K	150	33.7
200	1.77K	1,000	4.6x10^4	1.1x10^{-4}	1.1x10^{-4}	8,500	1.91K	230	51.7
500	4.43K	1,000	7.4x10^4	1.2x10^{-4}	1.2x10^{-4}	15,000	3.37K	560	125.9

1 = Female cable connector in scope of delivery at first delivery   *2 = Unsupported shaft

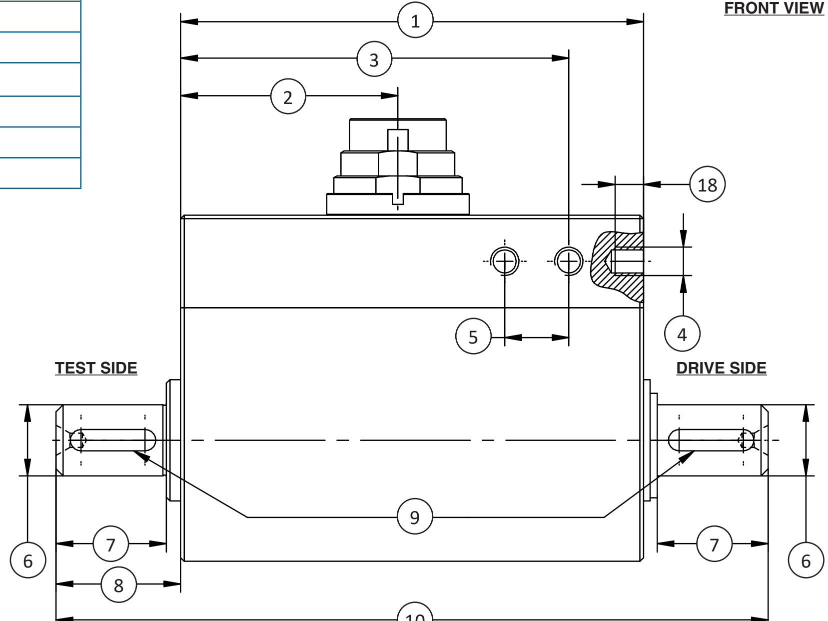
Dimensions

See Drawing	CAPACITIES	
	Metric (Nm)	U.S. (lbf-in)
	1, 2, 5, 10	8.85, 17.7, 44.3, 88.5
	mm	in
(1)	65	2.56
(2)	30.5	1.2
(3)	54.5	2.15
(4)	M4 (6 X)	
(5)	9	0.35
(6)	Ø 10 g6	
(7)	15.5	0.61
(8)	17.5	0.28
(9)	DIN 6885-1	
(10)	100	3.94
(11)	13.5	0.53
(12)	48.6	1.91
(13)	6.5	0.26
(14)	17	0.67
(15)	34	1.34
(16)	10	0.39
(17)	22	0.87
(18)	4	0.16

SIDE VIEW



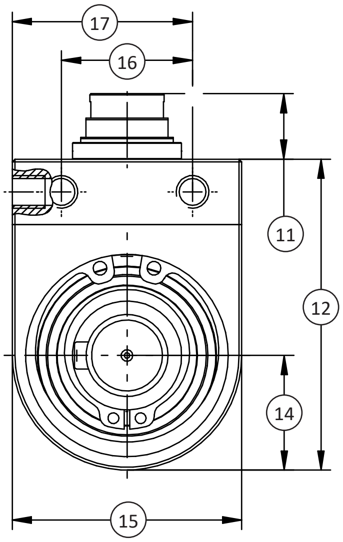
FRONT VIEW



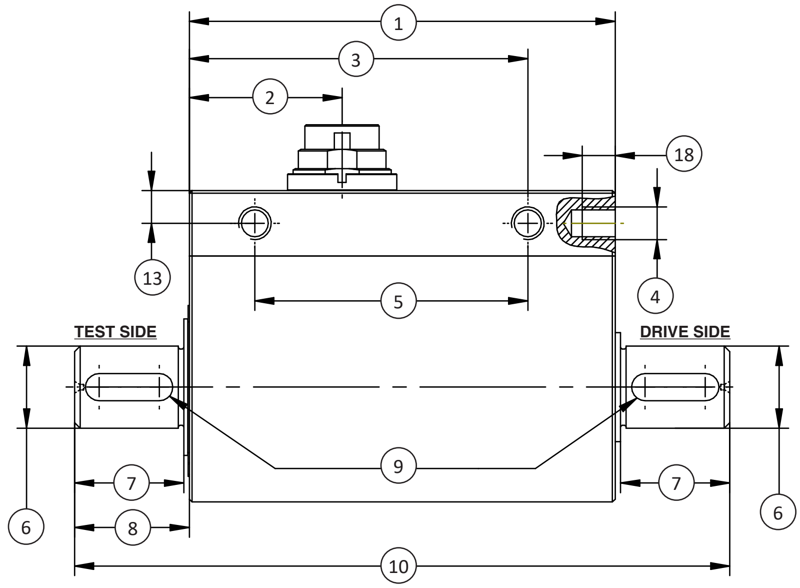
* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

T14 SLIP-RING ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

SIDE VIEW



FRONT VIEW



Dimensions

See Drawing	CAPACITIES					
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	20, 50	177, 443	100	885	200, 500	1770, 4425
	mm	in	mm	in	mm	in
(1)	78	3.07	78	3.07	92	3.62
(2)	28	1.1	28	1.1	43	1.69
(3)	62	2.44	62	2.44	79	3.11
(4)	M6 (4 X)		M6 (4 X)		M6 (6 X)	
(5)	50	1.97	50	1.97	66	2.6
(6)	Ø 15 g6	Ø 0.59 g6	Ø 18 g6	Ø 0.71 g6	Ø 32 g6	Ø 1.26 g6
(7)	20	0.79	24	0.94	40	1.57
(8)	21	0.83	25	0.98	44	1.73
(9)	DIN 6885-1		DIN 6885-1		DIN 6885-1	
(10)	120	4.72	128	5.04	180	7.08
(11)	12	0.47	12	0.47	12	0.47
(12)	57	2.24	57	2.24	70	2.76
(13)	6	0.24	6	0.24	6	0.24
(14)	21	0.83	21	0.83	28	1.1
(15)	42	1.65	42	1.65	56	2.2
(16)	24	0.94	24	0.94	24	0.94
(17)	33	1.3	33	1.3	40	1.57
(18)	6	0.24	6	0.24	10	0.39

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

FORCE MEASUREMENT SOLUTIONS.

T15 HEX DRIVE ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 0.2 to 20 Nm (1.77 to 177 lbf-in)
- Contactless - no slip rings
- High-level ±5V output
- 12-28V supply
- Bearingless non-contact design
- Angle measurement option
- Quick-Connect chuck
- 16-bit resolution

Specifications

		STANDARD	ENHANCED
ACCURACY – (MAX ERROR)			
Combined Error – %FS		±0.25	±0.1
Nonrepeatability – %		±0.05	±0.02
TEMPERATURE			
Effect on Zero – %RO / °C		±0.05	±0.02
Effect on Output – % / °C		±0.02	±0.01
Rated Range	°C	+5 to +45	
	°F	+41 to +113	
Operating Range	°C	0 to +60	
	°F	+32 to +140	
ELECTRICAL			
Output – VDC		±5	
Bandwidth – kHz – dB		1 –3	3 –3
Calibration Signal – % RO		100	
Supply Voltage – VDC		+12 to +28	
Supply Current – mA		60	
Electrical Connection – pin		8	
MECHANICAL			
Safe Overload – %RO		200	
Max Speed – rpm		See table	
Material		Aluminum	

ELECTRICAL CONNECTION

PIN	FUNCTION	DESCRIPTION
8-PIN T12 ELECTRICAL CONNECTION		
1	Supply (+)	12-28 VDC
2	Supply (GND)	0 VDC, TTL
3	Signal (+)	+5 VDC
4	Signal (GND)	0 VDC
5	Cal. Control	L < 2.0V / H > 3.5V
6	Option Angle A	TTL
7	Option Angle B	TTL
8	NC	–

STANDARD CONFIGURATION

MODEL T15 (Shown)

OPTIONS

- Angle measurement - 360 pulse TTL, 2-tracks 90° offset
- +10V torque output
- Enhanced accuracy - combined error +0.1%
- RS485 Output (U.S.es 12-pin connector, replaces +5 V)

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

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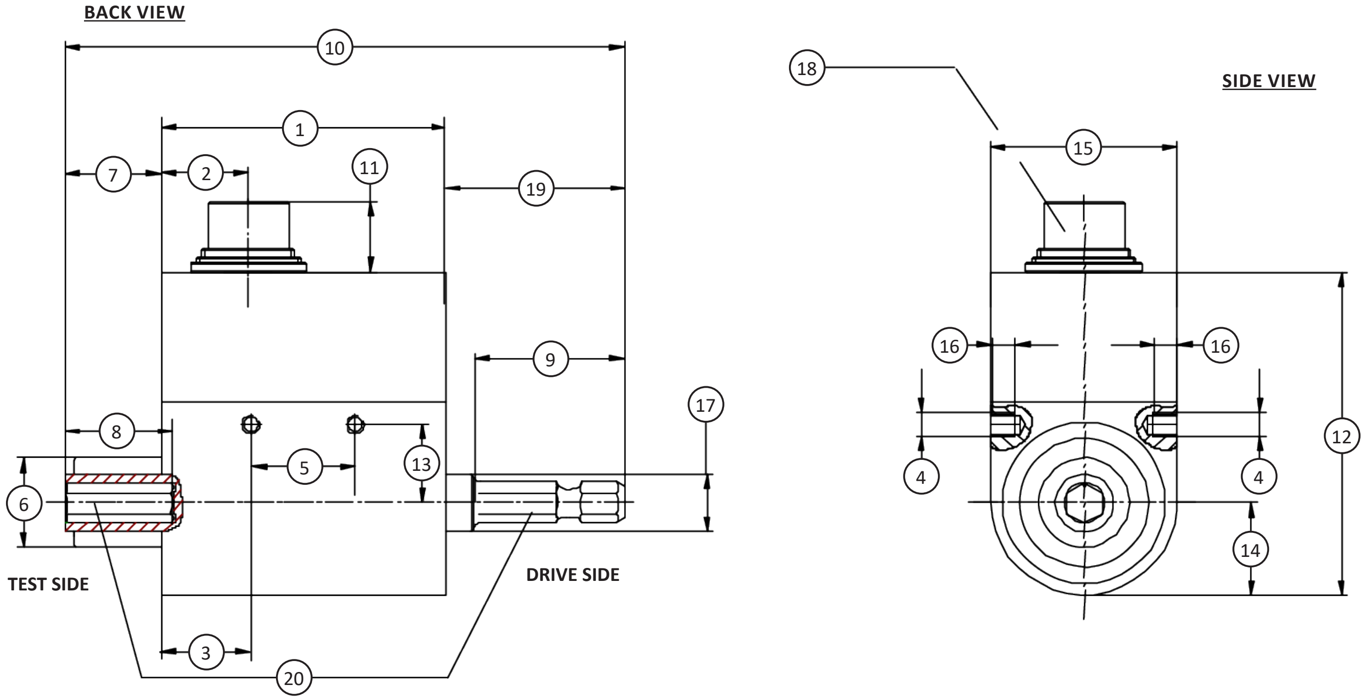
T15 HEX DRIVE ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



Dimensions

See Drawing	CAPACITIES	
	Metric (Nm)	U.S. (lbf-in)
	0.1, 0.2, 0.5, 1, 2, 5, 10, 15, 20	0.89, 1.77, 4.43, 8.85, 17.7, 44.3, 88.5, 133, 177
	mm	in
(1)	49	1.9
(2)	15	0.6
(3)	15.5	0.61
(4)	M4	
(5)	18	0.7
(6)	Ø15.5	Ø0.61
(7)	16.5	0.65
(8)	18.5	0.73
(9)	$26^{+0.2}$	$1.0^{+0.008}$
(10)	96.5	3.80
(11)	12	0.5
(12)	56	2.2
(13)	13.5	0.53
(14)	16	0.6
(15)	32	1.3
(16)	4	0.2
(17)	Ø10	Ø0.4
(18)	Connector 12-pin	
(19)	31	1.2
(20)	1/4" Hegaon DIN 3126 (ISO 1173) Design E/F –Quick action chuck	

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

T15 HEX DRIVE ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

PERFORMANCE PARAMETERS

CAPACITY		Hexagon		MAX RPM	SPRING RATE	MOMENT OF INERTIA – ($Kg \bullet m^2$)		MAX THRU.S.T LOAD		MAX SHEAR FORCE	
Nm	lbf-in	mm	in		NM/rad	Drive Side	Test Side	N	lbf	N	lbf
0.1	0.89	6.35	0.25	3,000	$1.8x10^1$	$2.6x10^{-6}$	$2.9x10^{-7}$	43	9.7	1.2	0.27
0.2	1.77	6.35	0.25	3,000	$1.8x10^1$	$2.6x10^{-6}$	$2.9x10^{-7}$	58	13.0	1.6	0.36
0.5	4.43	6.35	0.25	3,000	$1.1x10^2$	$2.6x10^{-6}$	$2.9x10^{-7}$	185	41.6	1.6	0.36
1	8.85	6.35	0.25	4,000	$1.1x10^2$	$2.6x10^{-6}$	$2.9x10^{-7}$	260	58.5	2.6	0.58
2	17.7	6.35	0.25	4,000	$2.9x10^2$	$2.6x10^{-6}$	$3.0x10^{-7}$	480	108	6.6	1.48
5	44.3	6.35	0.25	4,000	$4.6x10^2$	$2.6x10^{-6}$	$3.1x10^{-7}$	865	194	17	3.8
10	88.5	6.35	0.25	4,000	$5.2x10^2$	$2.6x10^{-6}$	$3.3x10^{-7}$	1150	259	24	5.4
15	133	6.35	0.25	4,000	$5.2x10^2$	$2.6x10^{-6}$	$3.3x10^{-7}$	1150	259	24	5.4
20	177	6.35	0.25	4,000	$5.2x10^2$	$2.6x10^{-6}$	$3.3x10^{-7}$	1150	259	24	5.4

Catalog 2019 06-15-2020

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

interface
FORCE MEASUREMENT SOLUTIONS.

T16 COMPACT SLIP RING ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 1 to 500 Nm (8.85 to 4.43K lbf-in)
- Very short axial length
- Compact design
- High accuracy 0.1% FS
- Keyed shaft

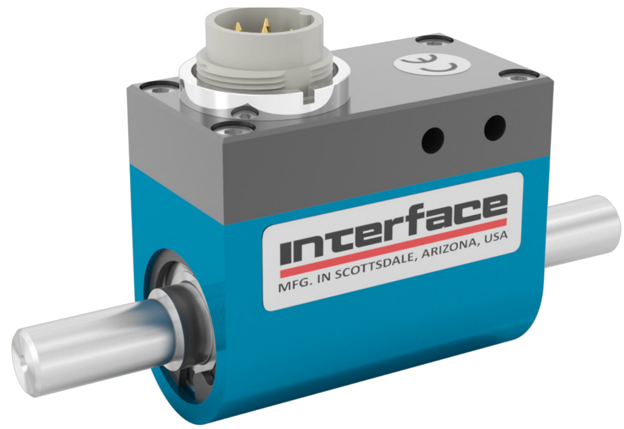
Specifications

ACCURACY – (MAX ERROR)			
Combined Error – %FS			±0.1
Nonrepeatability – %RO			±0.05
TEMPERATURE			
Effect on Zero – %RO / °C			±0.04
Effect on Output – RO% / °C			±0.02
Rated Range		°C	+5 to +50
		°F	+41 to +122
Operating Range		°C	-10 to +60
		°F	+14 to +140
ELECTRICAL			
Output – mV/V	1 Nm		+0.5
	8.85 lbf-in		
	2 - 500 Nm		+1.0
	17.7 - 4.43K lbf-in		
Excitation Voltage – VDC			2 - 12
Bridge Resistance – Ohm			350
Electrical Connection – pin			6
MECHANICAL			
Safe Overload – %RO			200
Shaft Material			Stainless steel
HoU.S.ing Material			Aluminum

OPTIONS

- Internal R-CAL Resistor – 100% output

STANDARD CONFIGURATION



MODEL T16 (Shown)

BRU.S.H LIFE

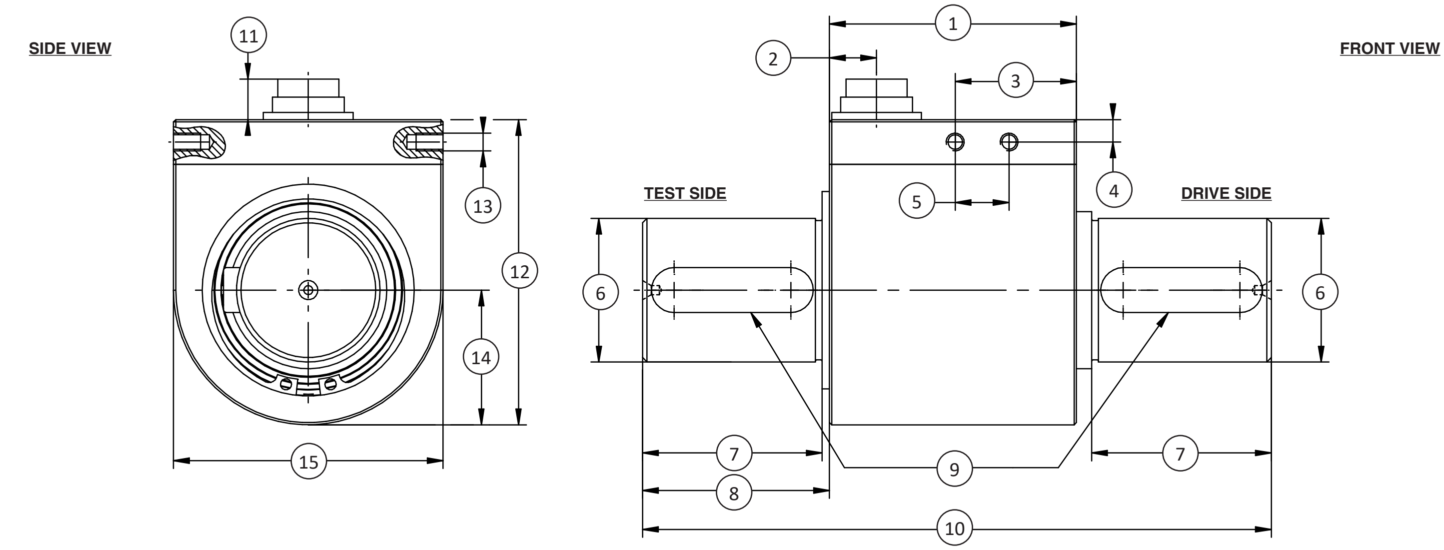
Speed (RPM)	CAPACITY					
	Nm	lbf-in	Nm	lbf-in	Nm	lbf-in
	1, 2, 5, 10	8.85, 17.7, 44.3, 88.5	20, 50, 100	177, 443, 885	200, 500	1.77K, 4.43K
10	10 years		7.6 years		5.7 years	
100	138 days		62 days		55 days	
500	233 hours		166 hours		100 hours	
1000	83 hours		50 hours		33 hours	
1500	44 hours		27 hours		-	
2000	25 hours		-		-	

PERFORMANCE PARAMETERS

CAPACITY		MAX RPM	SPRING RATE	MOMENT OF INERTIA – J (Kg•m²)		MAX THRU.S.T LOAD		MAX SHEAR LOAD	
Nm	lbf-in		NM/rad	Drive Side	Test Side	N	lbf	N	lbf
1	8.85	2,000	2.1E + 02	1.3E - 06	3.1E - 07	380	85.4	6	1.35
2	17.7	2,000	2.1E + 02	1.3E - 06	3.1E - 07	380	85.4	6	1.35
5	44.3	2,000	5.5E + 02	1.4E - 06	3.3E - 07	690	155	14.5	3.26
10	88.5	2,000	6.4E + 02	1.4E - 06	3.3E - 07	780	175	15.5	3.48
20	177	1,500	4.1E + 03	1.2E - 05	6.7E - 06	1750	393	53	11.9
50	443	1,500	1.1E + 04	1.2E - 05	7.0E - 06	3300	742	135	30.3
100	885	1,500	1.9E + 04	1.4E - 05	8.6E - 06	5200	1.17K	260	58.5
200	1.77K	1,000	5.4E + 04	9.6E - 05	6.7E - 05	8500	1.91K	340	76.4
500	4.43K	1,000	9.0E + 04	1.0E - 04	7.3E - 05	15000	3.37K	850	191

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

T16 COMPACT SLIP RING ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



Dimensions

See Drawing	CAPACITIES							
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	1, 2, 5, 10	**8.85, 17.7, 44.3, 88.5**	**20, 50**	**177, 443**	**100**	**885**	**200, 500**	**1770, 4425**
	mm	in	mm	in	mm	in	mm	in
(1)	45.5	1.79	47.4	1.87	47.4	1.87	55	2.2
(2)	12.2	0.48	10.5	0.41	10.5	0.41	10.5	0.41
(3)	17.6	0.69	20.5	0.81	20.5	0.81	27	1.1
(4)	5	0.2	5	0.2	5	0.2	5	0.2
(5)	9	0.4	9.5	0.37	9.5	0.37	12	0.5
(6)	Ø8 g6	Ø(0.3156/0.3150)	Ø15g6	Ø(0.5913/0.5905)	Ø18g6	Ø(0.7094/0.7087)	Ø32g6	Ø(1.2608/1.2598)
(7)	18	0.7	20	0.8	22	0.9	40	1.6
(8)	19.7	0.78	21.1	0.83	24.1	0.95	41.6	1.64
(9)	Key DIN 6885-1		Key DIN 6885-1		Key DIN 6885-1		Key DIN 6885-1	
(10)	85	3.3	90	3.5	95	3.7	140	5.5
(11)	10	0.4	10	0.4	10	0.4	10	0.4
(12)	39	1.5	54	2.1	54	2.1	68	2.7
(13)	M4 ↧ 6	M4 ↧ 0.2	M4 ↧ 6	M4 ↧ 0.2	M4 ↧ 6	M4 ↧ 0.2	M4 ↧ 6	M4 ↧ 0.2
(14)	12	0.5	21	0.8	21	0.8	30	1.2
(15)	24	0.9	42	1.7	42	1.7	60	2.4

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

FORCE MEASUREMENT SOLUTIONS.

T22 PULLEY ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 20 to 5K Nm (177 to 44K lbf-in)
- ±5 VDC output
- Digital electronics
- 10 kHz sample rate
- Contactless
- 16-bit resolution

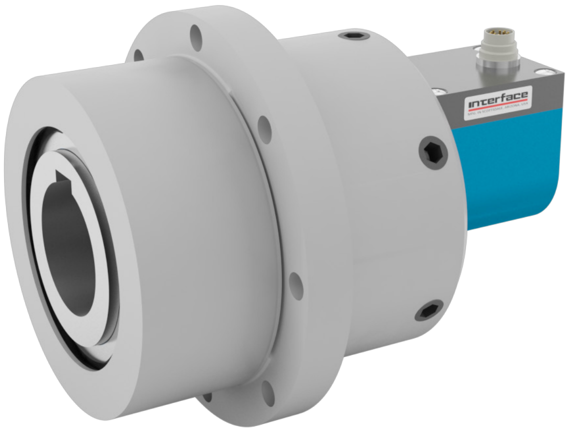
Specifications

ACCURACY – (MAX ERROR)		
Combined Error – %FS		±0.1
Nonrepeatability – %		±0.02
TEMPERATURE		
Effect on Zero – %RO / °C		±0.02
Effect on Output – % / °C		±0.01
Rated Range	°C	+5 to +45
	°F	+41 to +113
Operating Range	°C	+0 to +60
	°F	+32 to +140
ELECTRICAL		
Output – VDC		+5
Bandwidth – kHz – db		1 – 3
Calibration Signal – %RO		100
Supply Voltage – VDC		12 to 28
Supply Current – mA		60
Electrical Connection – pin		12
MECHANICAL		
Safe Overload – %RO		200
Max Speed – RPM		Varies with capacity. (See table)
HoU.S.ing Material		Aluminum

ELECTRICAL CONNECTION

8-PIN T12 ELECTRICAL CONNECTION		
PIN	**FUNCTION**	**DESCRIPTION**
1	NC	-
2	Option Angle B	5VDC TTL
3	Signal (+)	±5 VDC (±10VDC)
4	Signal (GND)	0 VDC
5	Supply (GND)	0 VDC
6	Supply (+)	12-28 VDC
7	Option Angle A	5VDC TTL
8	NC	-
9	NC	-
10	Cal. Control	L< 2.0 / H >; 3.5 V
11	NC	-
12	Shield	Transducer HoU.S.ing

STANDARD CONFIGURATION



MODEL T22 (Shown)

OPTIONS

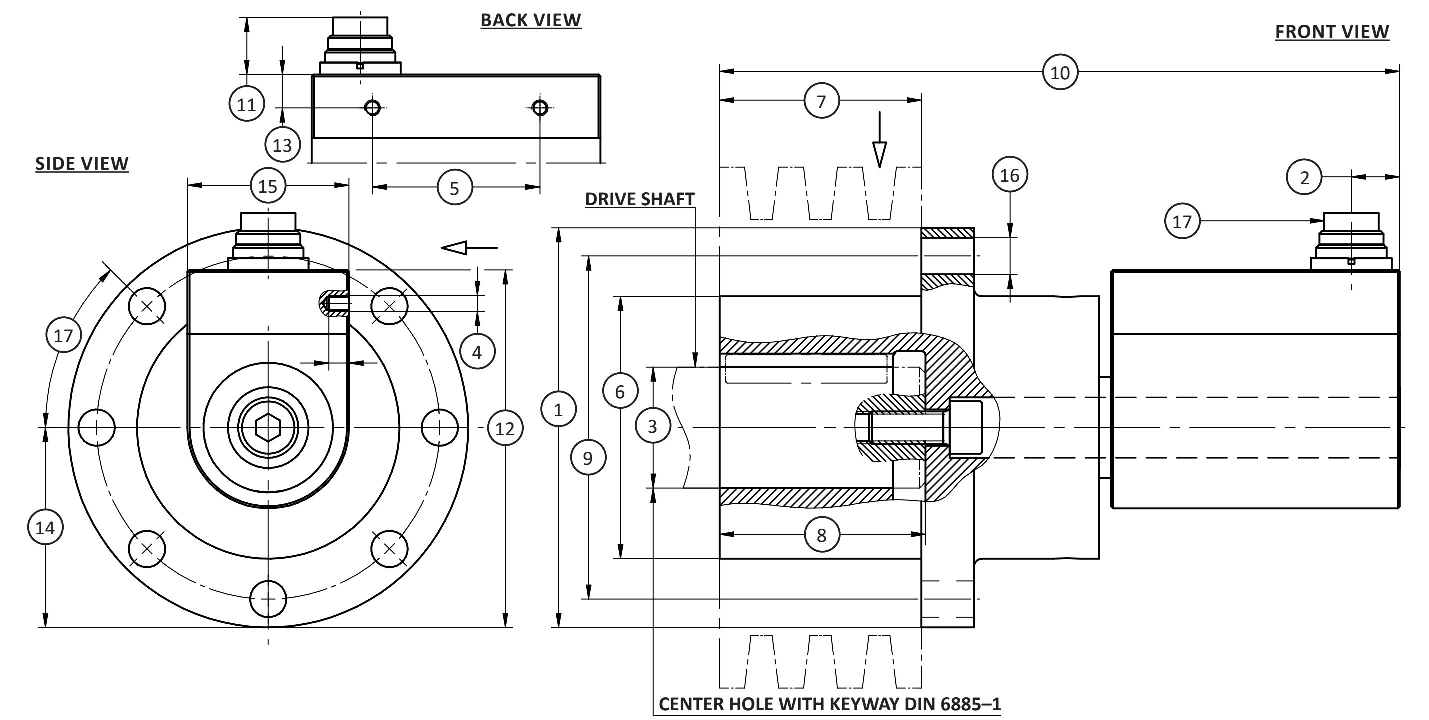
- Speed & angle measurement - 360 pulse TTL, 2-tracks 90° offset, available on capacities up to 1K Nm (8.85K lbf-in) only
- Speed output - 60 pulse TTL, 1-track, available on capacities 2K Nm (17.7K lbf-in) & above
- ±10V torque output
- U.S.B output & software

PERFORMANCE PARAMETERS

CAPACITY		MAX RPM	SPRING RATE	MOMENT OF INERTIA – J (Kg•m²)		MAX SHEAR FORCE	
Nm	lbf-in		NM/rad	Drive Side	Test Side	N	lbf
20	177	12,000	$1.3x10^4$	$1.6x10^{-4}$	$1.7x10^{-3}$	11K	2.47K
50	443	12,000	$2.6x10^4$	$1.6x10^{-4}$	$1.7x10^{-3}$	11K	2.47K
100	885	12,000	$5.3x10^4$	$1.6x10^{-4}$	$1.7x10^{-3}$	11K	2.47K
200	1.77K	12,000	$1.1x10^5$	$1.6x10^{-4}$	$1.7x10^{-3}$	11K	2.47K
500	4.43K	10,000	$3.1x10^5$	$2.4x10^{-3}$	$4.6x10^{-2}$	37K	8.32K
1K	8.85K	10,000	$6.7x10^5$	$2.4x10^{-3}$	$4.6x10^{-2}$	37K	8.32K
2K	17.7K	5,000	$9.4x10^5$	$1.8x10^{-2}$	$1.2x10^{-1}$	48K	10.8K
5K	44.3K	5,000	$2.5x10^6$	$1.8x10^{-2}$	$1.2x10^{-1}$	48K	10.8K

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

T22 PULLEY ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



Dimensions

See Drawing	CAPACITIES							
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	20, 50, 100, 200	**177, 443, 885, 1.77K**	**500**	**4.43K**	**1K**	**8.85K**	**2K, 5K**	**17.7K, 44.3K**
	mm	in	mm	in	mm	in	mm	in
(1)	Ø99	Ø3.90	Ø176	Ø6.93	Ø176	Ø6.93	Ø220	Ø8.66
(2)	12	0.47	15	0.59	15	0.59	15	0.59
(3)	Ø15 H7 - Ø30 H7	Ø(0.5913 / 0.5905) - Ø(1.1819 / 1.1811)	Ø40 H7 - Ø55H7	Ø(1.5758 / 1.5748) - Ø(2.1665 / 2.1653)	Ø50 H7 - Ø55 H7	Ø(1.9695 / 1.9685) - Ø(2.1665 / 2.1653)	Ø60 H7 - Ø85 H7	Ø(1.9695 / 1.9685) - Ø(3.3478 / 3.3464)
(4)	M4		M4		M4		M4	
(5)	41.5	1.63	29.5	1.16	29.5	1.16	29.5	1.16
(6)	Ø65g6	Ø2.56	Ø140g6	Ø5.51	Ø140g6	Ø5.51	Ø170g6	Ø6.69
(7)	$50^{+0.2}$	$1.97^{+0.008}$	$60^{+0.2}$	$2.36^{+0.008}$	$60^{+0.2}$	$2.36^{+0.008}$	$110^{+0.2}$	$4.43^{+0.008}$
(8)	51	2.01	80	3.15	80	3.15	130	5.12
(9)	Ø$85^{\pm0.2}$	Ø$3.35^{\pm0.008}$	Ø$158^{\pm0.2}$	Ø$6.22^{\pm0.008}$	Ø$158^{\pm0.2}$	Ø$6.22^{\pm0.008}$	Ø$195^{\pm0.2}$	Ø$7.68^{\pm0.008}$
(10)	168.5	6.63	227.5	8.96	227.5	8.96	287.5	11.32
(11)	14	0.6	14	0.6	14	0.6	14	0.6
(12)	88.5	3.48	135	5.31	135	5.31	157	6.18
(13)	$8.2^{+\pm0.1}$	$0.32^{\pm0.004}$	$8.2^{+\pm0.1}$	$0.32^{\pm0.004}$	$8.2^{+\pm0.1}$	$0.32^{\pm0.004}$	$8.2^{+\pm0.1}$	$0.32^{\pm0.004}$
(14)	49.5	1.95	88	3.43	88	3.43	110	4.33
(15)	40	1.57	58	2.28	58	2.28	58	2.28
(16)	Ø9	Ø0.35	Ø11	Ø0.43	Ø11	Ø0.43	Ø13	Ø0.51
(17)	Connector 12-pin		Connector 12-pin		Connector 12-pin		Connector 12-pin	

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

FORCE MEASUREMENT SOLUTIONS.

T22 PULLEY ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

PERFORMANCE PARAMETERS

CAPACITY		MAX RPM	SPRING RATE	MOMENT OF INERTIA – J (Kg•m²)		MAX THRU.S.T LOAD		MAX SHEAR FORCE	
Nm	lbf-in		NM / rad	Drive Side	Test Side	N	lbf	N	lbf
20	177	12,000	$1.3x10^4$	$1.6x10^{-4}$	$1.7x10^{-3}$	950	214	11K	2.47K
50	443	12,000	$2.6x10^4$	$1.6x10^{-4}$	$1.7x10^{-3}$	1.9K	427	11K	2.47K
100	885	12,000	$5.3x10^4$	$1.6x10^{-4}$	$1.7x10^{-3}$	4K	899	11K	2.47K
200	1.77K	12,000	$1.1x10^5$	$1.6x10^{-4}$	$1.7x10^{-3}$	7.4K	1.66K	11K	2.47K
500	4.43K	10,000	$3.1x10^5$	$2.4x10^{-3}$	$4.6x10^{-2}$	12.5K	2.81K	37K	8.32K
1K	8.85K	10,000	$6.7x10^5$	$2.4x10^{-3}$	$4.6x10^{-2}$	21K	4.72K	37K	8.32K
2K	17.7K	5,000	$9.4x10^5$	$1.8x10^{-2}$	$1.2x10^{-1}$	24K	5.40K	48K	10.8K
5K	44.3K	5,000	$2.5x10^6$	$1.8x10^{-2}$	$1.2x10^{-1}$	39K	8.77K	48K	10.8K

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

T23 LC ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 300 and 500 Nm (2.66K and 4.43K lbf-in)
- Stainless steel shaft
- +5 VDC output
- 12-28 VDC supply
- Contactless

Specifications

ACCURACY – (MAX ERROR)		
Combined Error – %FS		±0.25
Nonrepeatability – %		±0.05
TEMPERATURE		
Effect on Zero – %RO / °C		±0.04
Effect on Output – % / °C		±0.02
Rated Range	°C	+5 to +45
	°F	+41 to +113
Operating Range	°C	0 to +60
	°F	+32 to +140
ELECTRICAL		
Output – VDC		±5
Bandwidth – kHz – dB		1 – 3
Supply Voltage – VDC		+11 to +28
Supply Current – mA		< 90
Electrical Connection – Cable	m	1
	ft	3
MECHANICAL		
Safe Overload – %RO		180
Max Speed – rpm		3,500
Shaft Material		Stainless steel
HoU.S.ing Material		Aluminum

STANDARD CONFIGURATION

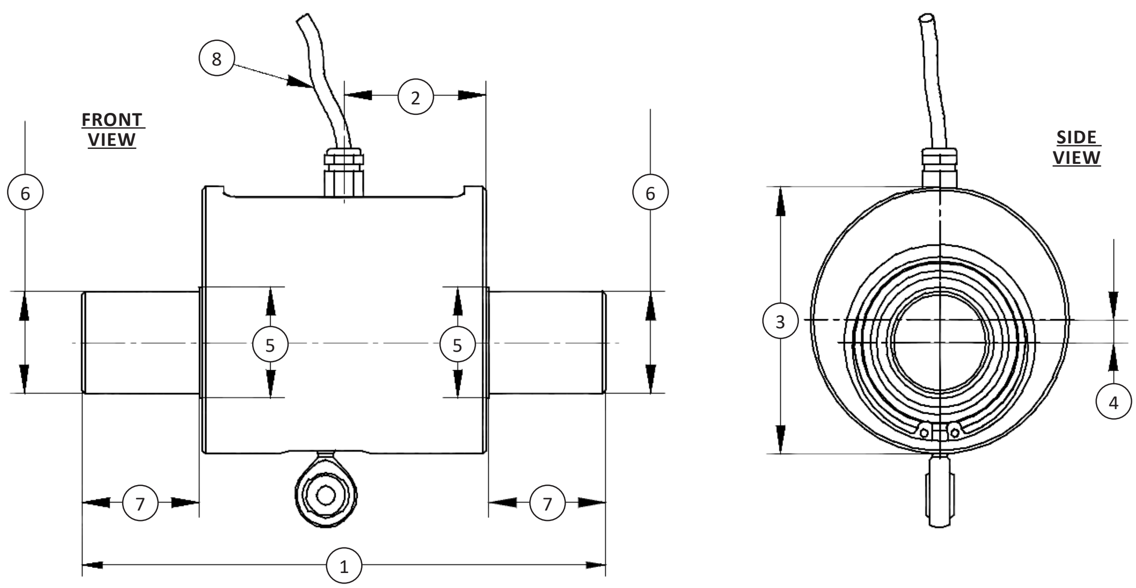
Model T23 (Shown)

OPTIONS

- Cable length
- Speed/angle

Dimensions

See Drawing	CAPACITIES	
	Metric (Nm)	U.S. (lbf-in)
	300, 500	2.66K, 4.43K
	mm	in
(1)	170	6.7
(2)	46	1.8
(3)	Ø84	Ø3.3
(4)	7	0.3
(5)	Ø35	Ø1.4
(6)	Ø32g6	Ø(1.2595 / 1.2589)
(7)	38	1.5
(8)	Ø5	Ø0.2



* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

Catalog 2019 06-15-2020

T25 HIGH SPEED ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

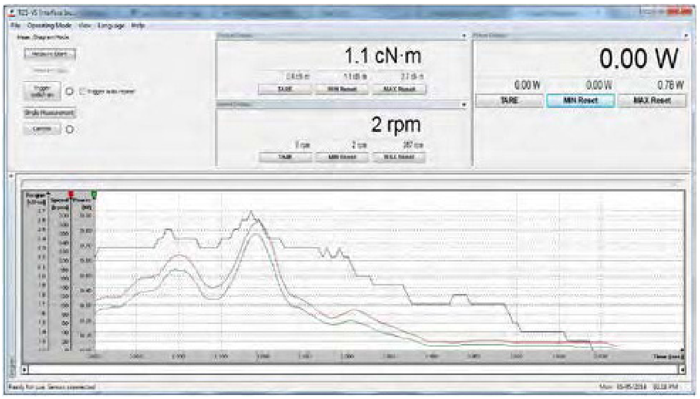
FEATURES & BENEFITS

- Capacities from 0.1 Nm to 5K Nm (0.885 to 44.3K lbf-in)
- 0.1% combined error
- Speed up to 30K RPM
- Unique design eliminates RPM dependent bearing friction effects
- Foot or float mount
- Remote activated on-shaft shunt calibration
- ±5VDC output
- 12-28 VDC supply
- Contactless data transmission
- Digital electronics
- 10 kHz sample rate
- 16-bit resolution

OPTIONS

- ±0.05% combined error
- Encoder for speed/angle measurement
- Keyed shaft per DIN 6885.1
- Right angle mating connector or cable assembly
- ±10 VDC output
- RS485 output
- U.S.B output – includes encoder option and display graphing and logging software (replaces ±5V output)

SOFTWARE FOR U.S.B OPTION



STANDARD CONFIGURATION

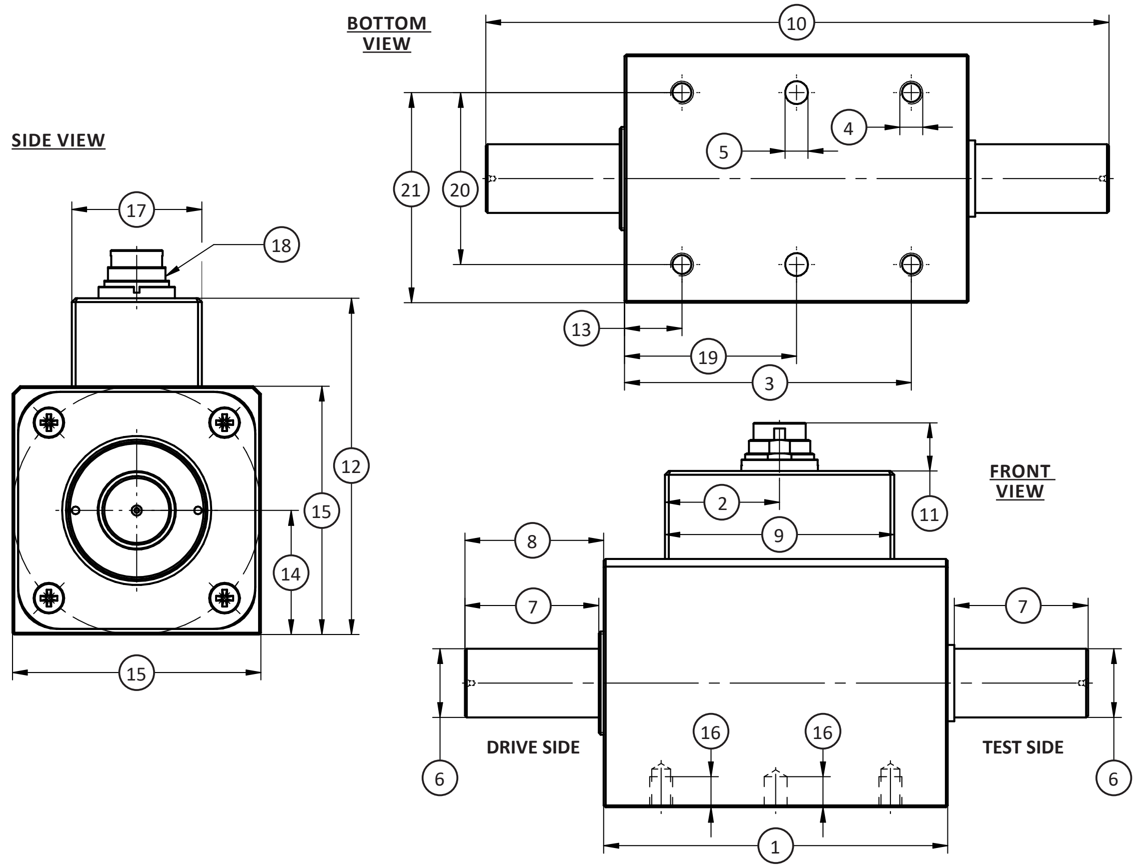
Model T25 (Shown)

Specifications

ACCURACY - (MAX ERROR)		
Combined Error – %FS		±0.1
Nonrepeatability – %RO		±0.02
Resolution – bit		16
TEMPERATURE		
Effect on Zero – %RO	°C	±0.02
	°F	±0.01
Effect on Output – %	°C	±0.01
	°F	±0.006
Compensated Range	°C	+5 to +45
	°F	+41 to +113
Operating Range	°C	0 to +60
	°F	+32 to +140
Storage Range	°C	-10 to +70
	°F	+14 to +158
ELECTRICAL		
Supply Voltage – VDC		+12 to +28
Supply Current – mA		≤60
Output – VDC		±5
Bandwidth – kHz – dB		1, 3
Sample Rate – kHz		10
Calibration Signal – %FS		100
Electrical Connection		12-pin binder series 581 (includes mate)
Encoder Option		360 pulse/rev, 2-track, +5V TTL, 90° offset, quadrature encoder
MECHANICAL		
Safe Overload – %RO		200
Max Speed – RPM		Varies with capacity (see table)
Shaft Material		Alloy Steel
HoU.S.ing Material		Aluminum
Level of Protection		IP 50

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

T25 HIGH SPEED ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



Dimensions

Parameters	NOMINAL TORQUE											
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	0.1, 0.2, 0.5, 1, 2, 5	0.885, 1.77, 4.43, 8.85, 17.7, 44.3	10	88.5	20, 30, 50, 100	177, 266, 443, 885	200, 500	1770, 4425	1K	8.85K	2K, 5K	17.7K, 44.3K
	mm	in	in	mm	in	mm	in	mm	in	mm	in	mm
(1)	71	2.8	71	2.8	90	3.5	120	4.7	120	4.7	144	5.7
(2)	30	1.2	30	1.2	30	1.2	30	1.2	30	1.2	30	1.2
(3)	59	2.3	59	2.3	75	3.0	10	0.4	10	0.4	119	4.7
(4)	M4		M4		M6		M8		M8		M12	
(5)	Ø4 H7	Ø(0.1580 / 0.1575)	Ø4 H7	Ø(0.1580 / 0.1575)	Ø6 H7	Ø(0.2367 / 0.2362)	Ø8 H7	Ø(0.3156 / 0.3150)	Ø8H7	Ø (0.3156 / 0.3150)	Ø12 H7	Ø(0.4731 / 0.4724)
(6)	Ø8 g6	Ø(0.3148 / 0.3144)	Ø10 g6	Ø(0.3935 / 0.3931)	Ø18 g6	Ø(0.7084 / 0.7080)	Ø32 g6	Ø(1.2595 / 1.2589)	Ø42 g6	Ø(1.6532 / 1.6526)	Ø70 g6	Ø(2.7555 / 2.7548)
(7)	16.5	0.65	16.5	0.65	35	1.4	55	2.2	55	2.2	110	4.3
(8)	19	0.7	19	0.7	35.5	1.40	56.5	2.22	56.5	2.22	114	4.5
(9)	60	2.4	60	2.4	60	2.4	60	2.4	60	2.4	60	2.4
(10)	110	4.3	110	4.3	163	6.4	234	9.2	234	9.2	372	14.6
(11)	13	0.5	13	0.5	13	0.5	13	0.5	13	0.5	13	0.5
(12)	63	2.5	63	2.5	88	3.5	118	4.6	118	4.6	163	6.4
(13)	12	0.5	12	0.5	15	0.6	20	0.8	20	0.8	25	1.0

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

Interface
FORCE MEASUREMENT SOLUTIONS.

T25 HIGH SPEED ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

Dimensions (CONTINUED)

Parameters	NOMINAL TORQUE											
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	0.1, 0.2, 0.5, 1, 2, 5	0.89, 1.77, 4.43, 8.85, 17.7, 44.3	10	88.5	20, 30, 50, 100	177, 266, 443, 885	200, 500	1770, 4425	1K	8.85K	2K, 5K	17.7K, 44.3K
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
(14)	$20^{\pm0.05}$	$0.8^{\pm0.002}$	$20^{\pm0.05}$	$0.8^{\pm0.002}$	$32.5^{\pm0.05}$	$1.28^{\pm0.002}$	$47.5^{\pm0.05}$	$1.87^{\pm0.002}$	$47.5^{\pm0.05}$	$1.87^{\pm0.002}$	$70^{\pm0.05}$	$2.8^{\pm0.002}$
(15)	40	1.6	40	1.6	65	2.6	95	3.7	95	3.7	140	5.5
(16)	8	0.3	8	0.3	8	0.3	14	0.6	14	0.6	20	0.8
(17)	34	1.3	34	1.3	34	1.3	34	1.3	34	1.3	34	1.3
(18)	12-pin connector		12-pin connector		12-pin connector		12-pin connector		12-pin connector		12-pin connector	
(19)	$35.5^{\pm0.05}$	$1.40^{\pm0.002}$	$35.5^{\pm0.05}$	$1.40^{\pm0.002}$	$45^{\pm0.05}$	$1.8^{\pm0.002}$	$60^{\pm0.05}$	$2.4^{\pm0.002}$	$60^{\pm0.05}$	$2.4^{\pm0.002}$	$72^{\pm0.05}$	$2.8^{\pm0.002}$
(20)	30	1.2	30	1.2	45	1.8	70	2.8	70	2.8	100	3.9
(21)	35	1.4	35	1.4	55	2.3	82.5	3.25	82.5	3.25	120	4.7

PERFORMANCE PARAMETERS

CAPACITY		WEIGHT		MAX RPM	SPRING RATE	MOMENT OF INERTIA (kg•m²)		MAX THRU.S.T LOAD**		MAX SHEAR FORCE**	
(Nm)	(lbf-in)	(kg)	lbs		(NM/rad)	Drive Side	Test Side	(N)	(lbf)	(N)	(lbf)
0.1	0.89	0.5	1.10	30,000	$1.8x10^{1}$	$9.2x10^{-6}$	$2.5x10^{-7}$	43	10.0	1.5	0.34
0.2	1.77	0.5	1.10	30,000	$1.8x10^{1}$	$9.2x10^{-6}$	$2.5x10^{-7}$	58	13.0	2	0.4
0.5	4.43	0.5	1.10	30,000	$9.4x10^{1}$	$9.2x10^{-6}$	$2.5x10^{-7}$	240	54.0	3	0.7
1	8.85	0.5	1.10	30,000	$9.4x10^{1}$	$9.2x10^{-6}$	$2.5x10^{-7}$	240	54.0	3	0.7
2	17.7	0.5	1.10	30,000	$3.7x10^{2}$	$9.2x10^{-6}$	$2.5x10^{-7}$	480	108	7	1.6
5	44.3	0.5	1.10	30,000	$7.7x10^{2}$	$9.2x10^{-6}$	$2.6x10^{-7}$	900	202	16.5	3.71
10	88.5	0.6	1.32	30,000	$8.8x10^{2}$	$9.3x10^{-6}$	$3.4x10^{-7}$	1.05K	236	21	4.7
20	177	1.6	3.53	20,000	$5.1x10^{3}$	$1.2x10^{-4}$	$6.8x10^{-6}$	2.3K	517	44	9.9
30	266	1.6	3.53	20,000	$5.1x10^{3}$	$1.2x10^{-4}$	$6.8x10^{-6}$	2.3K	517	44	9.9
50	443	1.6	3.53	20,000	$9.6x10^{3}$	$1.2x10^{-4}$	$7.4x10^{-6}$	5K	1.12K	142	31.9
100	885	1.6	3.53	20,000	$9.6x10^{3}$	$1.2x10^{-4}$	$7.4x10^{-6}$	5K	1.12K	142	31.9
200	1.77K	4.8	10.58	15,000	$8.9x10^{4}$	$5.4x10^{-4}$	$4.4x10^{-4}$	10K	2.25K	275	61.8
500	4.43K	4.8	10.58	15,000	$1.3x10^{5}$	$5.4x10^{-4}$	$4.4x10^{-4}$	13K	2.92K	400	89.9
1K	8.85K	5.6	12.35	15,000	$1.7x10^{5}$	$6.4x10^{-4}$	$5.3x10^{-4}$	20K	4.5K	920	207
2K	17.7K	19.0	41.89	12,000	$6.3x10^{5}$	$5.7x10^{-3}$	$5.1x10^{-3}$	34K	7.64K	1.25K	281
5K	44.3K	19.0	41.89	12,000	$9.6x10^{5}$	$5.8x10^{-3}$	$5.2x10^{-3}$	64K	14.4K	2.9K	652

T25 HIGH SPEED ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

Electrical CONNECTION

Pin	12-PIN Electrical CONNECTION		12-Pin RS485 Option	
	Function	Description	Function	Description
A	NC	-	NC	-
B	Option Angle B	TTL	Option Angle B	TTL
C	Signal (+)	±5 VDC (±10 VDC)	NC	-
D	Signal (GND)	0 VDC	NC	-
E	Supply (GND)	0 VDC, TTL	Supply (GND)	0 VDC
F	Supply (+)	12-28 V	Supply (+)	12-28 VDC
G	Option Anfle A	TTL	Option Angle A	TTL
H	NC	-	NC	-
J	NC	-	RS485 Option	RS485 (B)
K	Cal, Control	L <2.0 V/H> 3.5 V	NC	-
L	NC	-	RS485 Option	RS485 (A)
M	HoU.S.ing	-	HoU.S.ing	-

*** Allowable without significant effect on measurement and applies to unsupported shaft only*

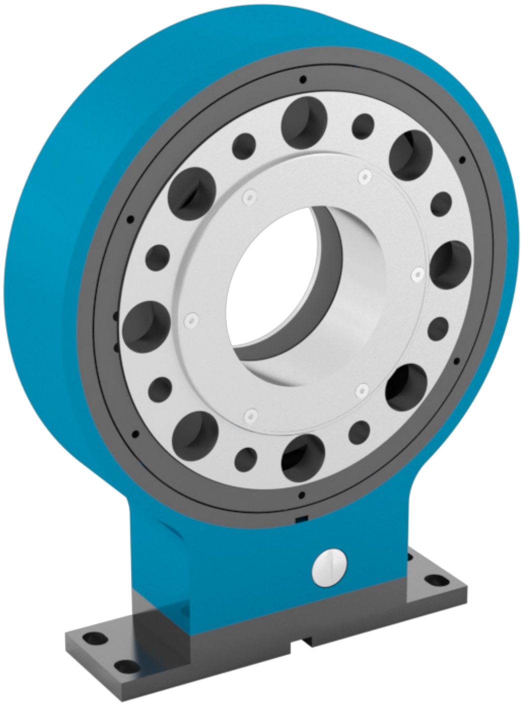
FORCE MEASUREMENT SOLUTIONS.

T27 HOLLOW FLANGE ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 50 to 10K Nm (443 to 88.5K lbf-in)
- ±5V output
- Very short axial length
- Large thru-hole design
- Bearingless

STANDARD CONFIGURATION



Model T27 (Shown)

Specifications

ACCURACY – (MAX ERROR)		
Combined Error – %FS		±0.1
Nonrepeatability – %RO		±0.02
TEMPERATURE		
Effect on Zero – %RO / °C		±0.02
Effect on Output – % / °C		±0.01
Compensated Range	°C	+5 to +45
	°F	+41 to +113
Operating Range	°C	0 to +60
	°F	+32 to +140
ELECTRICAL		
Output – VDC		±5
Bandwidth – kHz – dB		1 – 3
Supply Voltage – VDC		12 - 28
Supply Current – mA		90
Electrical Connection		12-pin binder
Resolution		Analog
MECHANICAL		
Safe Overload – %RO		200
Balance Grade – DIN ISO 1940		6.3
IP Rating		IP54
Material		Alloy steel

OPTIONS

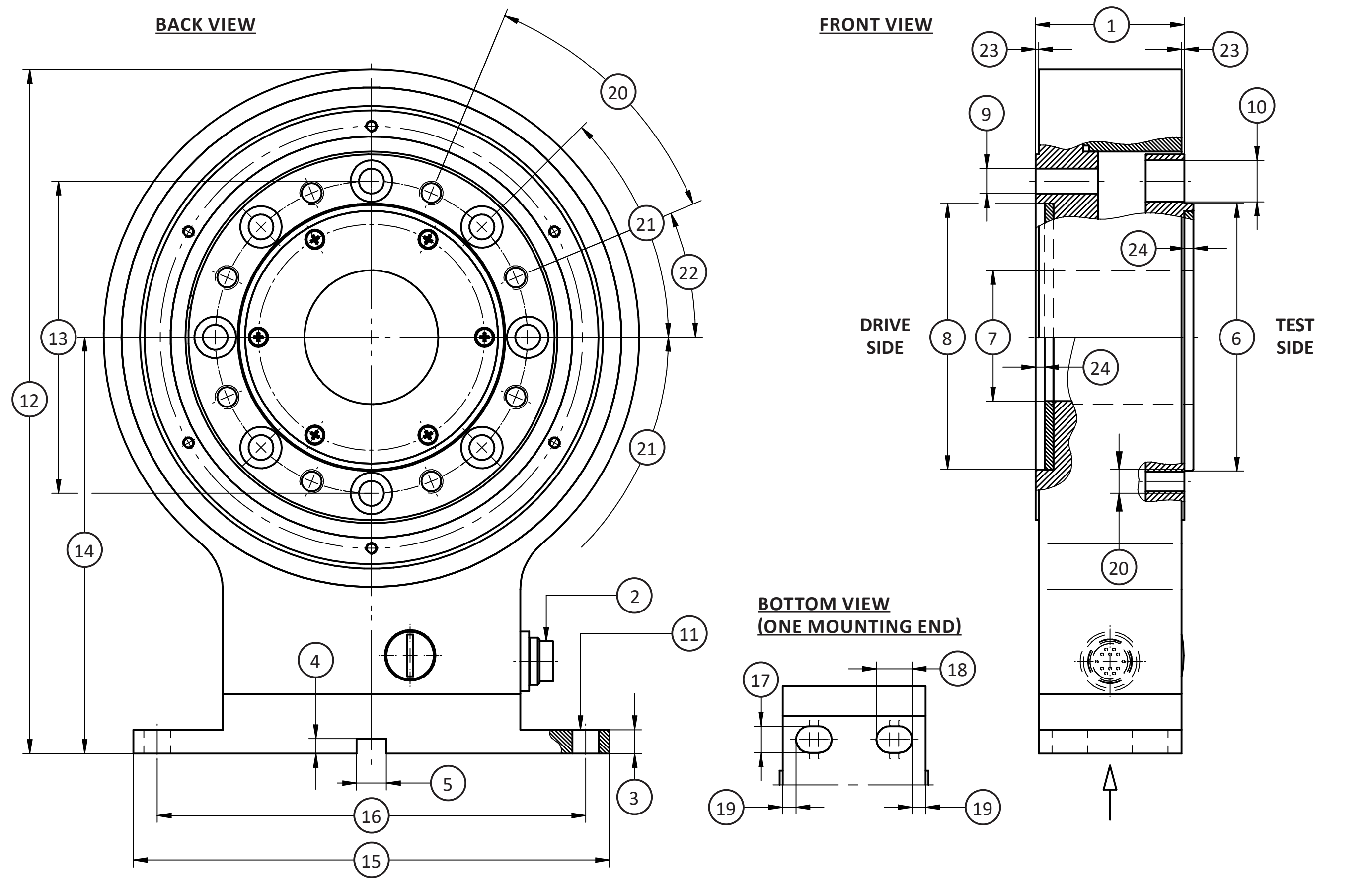
- ±10V output
- Speed measurement – 30 pulse, +5V TTL

PERFORMANCE PARAMETERS

CAPACITY		MAX RPM	SPRING RATE	MOMENT OF INERTIA (kg•m²)		MAX THRU.S.T LOAD**		MAX SHEAR FORCE**	
(Nm)	(lbf-in)		(NM/rad)	Drive Side	Test Side	(N)	(lbf)	(N)	(lbf)
50	443	15,000	$8.3x10^{4}$	$5.8x10^{-4}$	$1.1x10^{-3}$	650	146	190	42.7
100	885	15,000	$1.4x10^{5}$	$5.8x10^{-4}$	$1.1x10^{-3}$	1.1K	247	330	74.2
200	1.77K	15,000	$3.2x10^{5}$	$9.2x10^{-4}$	$1.8x10^{-3}$	1.6K	360	550	124
500	4.43K	12,000	$1.1x10^{6}$	$1.3x10^{-4}$	$4.0x10^{-3}$	2K	450	1200	270
1K	8.85K	12,000	$3.5x10^{6}$	$1.3x10^{-4}$	$4.1x10^{-3}$	4K	899	2700	607
2K	17.7K	10,000	$6.7x10^{6}$	$3.1x10^{-3}$	$1.3x10^{-2}$	5.4K	1.21K	3300	742
5K	44.3K	8,000	$14.3x10^{6}$	$7.8x10^{-3}$	$3.0x10^{-2}$	5.7K	1.28K	5200	1.17K
10K	8.85K	8,000	$14.3x10^{6}$	$7.8x10^{-3}$	$3.0x10^{-2}$	5.7K	1.28K	5200	1.17K

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

T27 HOLLOW FLANGE ROTARY TORQUE TRANSDUCER (U.S. & METRIC)



Dimensions

See Drawing	CAPACITIES									
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	50, 100	443, 885	200	1.77K	500, 1K	4.43K, 8.85K	2K	17.7K	5K, 10K	44.3K, 88.5K
	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	50	2.0	50	2.0	50	2.0	55	2.2	55	2.2
(2)	Connector 12-pin		Connector 12-pin		Connector 12-pin		Connector 12-pin		Connector 12-pin	
(3)	8	0.3	8	0.3	8	0.3	8	0.3	8	0.3
(4)	5	0.2	5	0.2	5	0.2	5	0.2	5	0.2
(5)	Ø$10^{+0.1}$	Ø$0.4^{+0.004}$	Ø$10^{+0.1}$	Ø$0.4^{+0.004}$	Ø$10^{+0.1}$	Ø$0.4^{+0.004}$	Ø$10^{+0.1}$	Ø$0.4^{+0.004}$	Ø$10^{+0.1}$	Ø$0.4^{+0.004}$
(6)	Ø75 g6	Ø(2.9524 / 2.9516)	Ø90 g6	Ø(3.5428 / 3.5420)	Ø110 g6	Ø(4.3302 / 4.3294)	Ø140 g6	Ø(5.5112 / 5.5103)	Ø174 g6	Ø(6.8498 / 6.8488)
(7)	Ø$40^{+0.2}$	Ø$1.6^{+0.008}$	Ø$45^{+0.2}$	Ø$1.6^{+0.008}$	Ø$70^{+0.2}$	Ø$2.8^{+0.008}$	Ø$80^{+0.2}$	Ø$3.1^{+0.008}$	Ø$100^{+0.2}$	Ø$3.9^{+0.008}$
(8)	Ø75 H7	Ø2.9539 / 2.9527	Ø90 H7	Ø3.5447 / 3.5433	Ø110 H7	Ø4.3321 / 4.3307	Ø140 H7	Ø5.5134 / 5.5112	Ø174 H7	Ø6.8519 / 6.8504
(9)	Ø6.4	Ø0.25	Ø8.4	Ø0.33	Ø13	Ø0.5	Ø15	Ø0.6	Ø19	Ø0.7
(10)	Ø11	Ø0.4	Ø14	Ø0.6	Ø20	Ø0.8	Ø24	Ø0.9	Ø30	Ø1.2
(11)	M8 x 4		M8 x 4		M8 x 4		M8 x 4		M8 x 4	
(12)	211	8.3	230	9.1	250	9.8	300	11.8	360	14.2
(13)	Ø$87^{\pm0.1}$	Ø$3.4^{\pm0.004}$	Ø$105^{\pm0.1}$	Ø$4.1^{\pm0.004}$	Ø$133^{\pm0.1}$	Ø$5.2^{\pm0.004}$	Ø$165^{\pm0.1}$	Ø$6.5^{\pm0.004}$	Ø$206^{\pm0.1}$	Ø$8.1^{\pm0.004}$
(14)	$130.5^{\pm0.1}$	$5.14^{\pm0.004}$	$140^{\pm0.1}$	$5.5^{\pm0.004}$	$150^{\pm0.1}$	$5.9^{\pm0.004}$	$175^{\pm0.1}$	$6.9^{\pm0.004}$	$205^{\pm0.1}$	$8.1^{\pm0.004}$
(15)	160	6.3	160	6.3	160	6.3	160	6.3	160	6.3

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

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T27 HOLLOW FLANGE ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

Dimensions (CONTINUED)

See Drawing	CAPACITIES									
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	50, 100	443, 885	200	1.77K	500, 1K	4.43K, 8.85K	2K	17.7K	5K, 10K	44.3K, 88.5K
	mm	in	mm	in	mm	in	mm	in	mm	in
(16)	$144^{\pm0.1}$	$5.7^{\pm0.004}$	$144^{\pm0.1}$	$5.7^{\pm0.004}$	$144^{\pm0.1}$	$5.7^{\pm0.004}$	$144^{\pm0.1}$	$5.7^{\pm0.004}$	$144^{\pm0.1}$	$5.7^{\pm0.004}$
(17)	9	0.4	9	0.4	9	0.4	9	0.4	9	0.4
(18)	12	0.5	12	0.5	12	0.5	12	0.5	12	0.5
(19)	4.5	0.18	4.5	0.18	4.5	0.18	4.5	0.18	4.5	0.18
(20)	8 x 45° (=360°)		8 x 45° (=360°)		8 x 45° (=360°)		8 x 45° (=360°)		8 x 45° (=360°)	
(21)	45°		45°		45°		45°		45°	
(22)	22.5°		22.5°		22.5°		22.5°		22.5°	
(23)	1	0.04	1	0.04	1	0.04	3.5	0.14	3.5	0.14
(24)	3	0.1	3	0.1	3	0.1	3	0.1	3	0.1

FORCE MEASUREMENT SOLUTIONS.

T31, T32, T33, & T34 SPINDLE TORQUE TRANSDUCER (U.S. & METRIC)

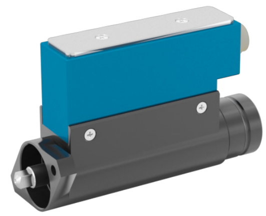
FEATURES & BENEFITS

- Capacities From 1 - 500 Nm (8.85 - 4.43K lbf-in)
- ±5V output (10V option)
- Speeds up to 2000 rpm
- Integrated speed/angle measurement
- Very short axial length
- High torsional stiffness
- Reliable and durable
- Simplifies installation

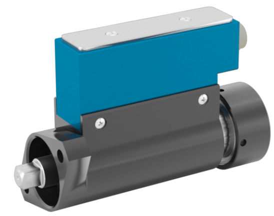
Specifications

ACCURACY – (MAX ERROR)		
Combined Error – %FS		±0.3
Nonrepeatability – %RO		±0.05
TEMPERATURE		
Effect on Zero – %RO / °C		±0.05
Effect on Output – % / °C		±0.02
Compensated Range	°C	+5 to +45
	°F	+41 to +113
Operating Range	°C	0 to +60
	°F	+32 to +140
ELECTRICAL		
Supply Voltage – VDC		12 - 28
Supply Current – mA		90
Output – VDC		±5
Sample Rate – kHz		10
Bandwidth – kHz – dB		1 – 3
Resolution – bit		12
Calibration Signal – %FS		100
Electrical Connection		12-pin binder
Encoder		360/rev, 2-track, +5V TTL, 90° offset, quadrature
MECHANICAL		
Safe Overload – %RO		150
Maximum RPM		2000
Protection Class		IP50
Material		Alloy steel

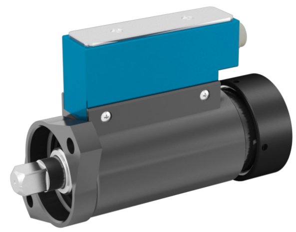
STANDARD CONFIGURATION



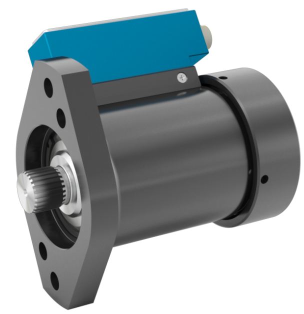
Model T31 (Shown)



Model T32 (Shown)



Model T33 (Shown)



Model T34 (Shown)

Electrical CONNECTION

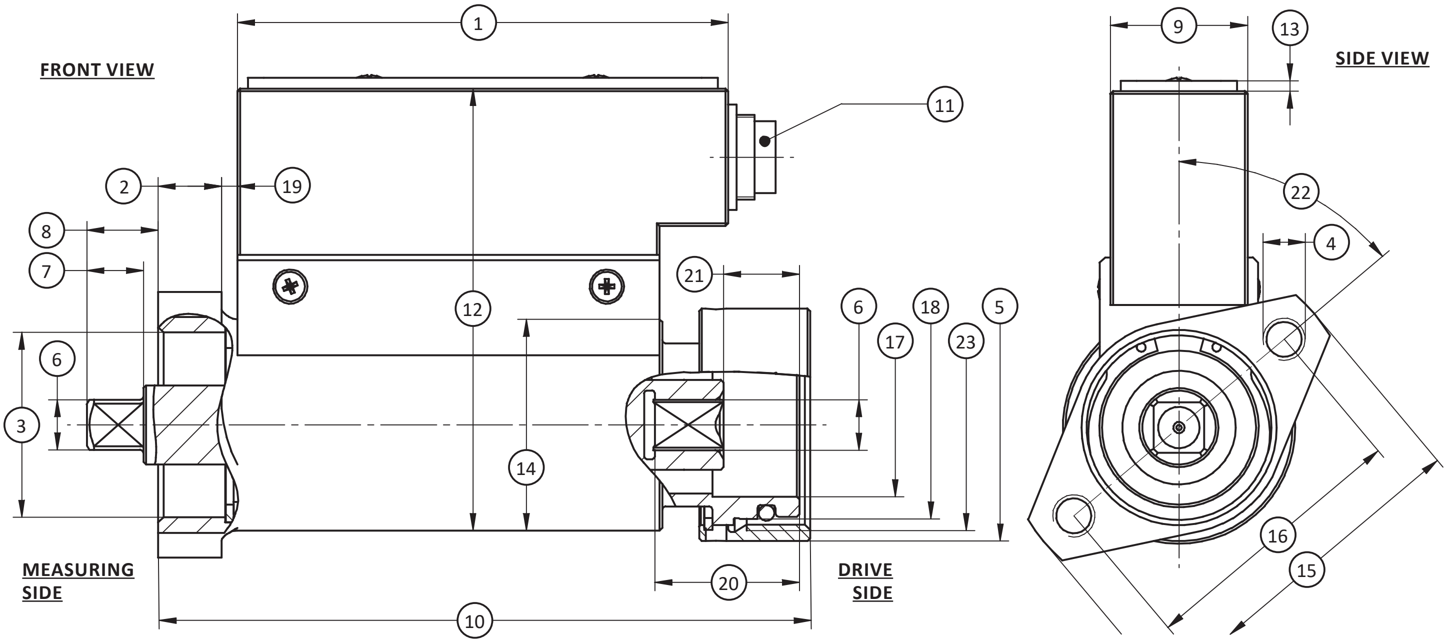
Pin	12-PIN Electrical CONNECTION	
	Function	**Description**
A	NC	–
B	Option Angle B	5VDC TTL
C	Signal (+)	±5VDC (±10VDC)
D	Signal (GND)	0V
E	Supply (GND)	0V
F	Supply (+)	12-28 VDC
G	Option Angle A	5VDC TTL
H	NC	–
J	NC	–
K	Control Signal	L < 2.0V / H > 3.5VDC
L	NC	–
M	Shield	–

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

FORCE MEASUREMENT SOLUTIONS.

T31, T32, T33, & T34 SPINDLE TORQUE TRANSDUCER (U.S. & METRIC)

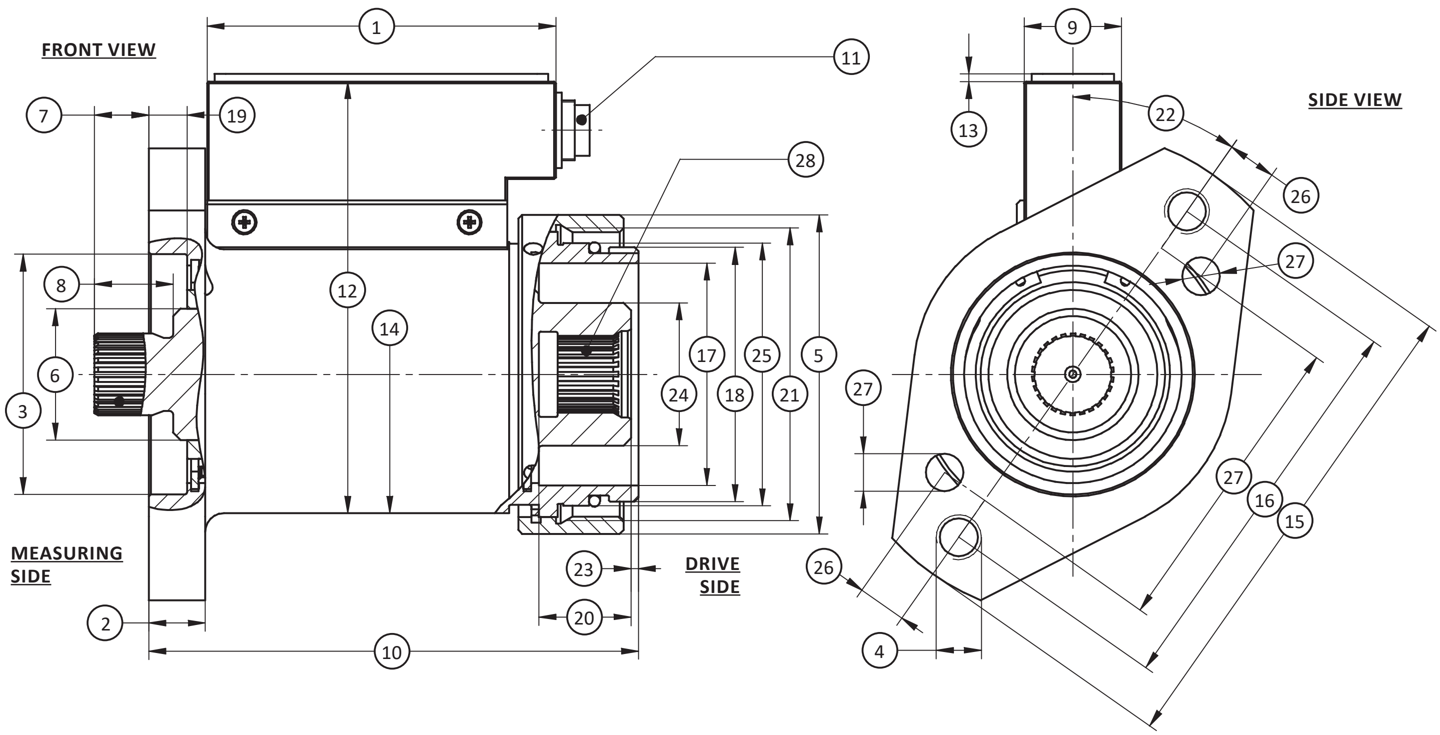
T31, T32, T33 Dimensions



See Drawing	T31		T32		T33	
	CAPACITIES					
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	1, 3, 6, 12	8.85, 26.6, 53.1, 106	4, 6, 12, 35, 60, 80	35.4, 53.1, 106, 310, 531, 708	60, 90, 95, 160, 200, 240	531, 797, 841, 1.42K, 1.77K, 2.12K
	mm	in	mm	in	mm	in
(1)	93	3.7	93	3.7	93	3.7
(2)	8	0.3	12	0.5	12	0.5
(3)	Ø30 H8	Ø(1.1824 / 1.1811)	Ø35 H8	Ø(1.3795 / 1.3779)	Ø50 H10	Ø(1.9724 / 1.9685)
(4)	M6		M8		M10	
(5)	–	–	Ø44	Ø1.7	Ø58	Ø2.3
(6)	□1/4"		□3/8"		□1/2"	
(7)	7.3	0.29	10.7	0.42	15.5	0.61
(8)	10	0.4	13.5	0.53	19.5	0.77
(9)	26	1.02	26	1.02	26	1.02
(10)	117	4.6	123.5	4.86	135.4	5.33
(11)	Connector 12-pin		Connector 12-pin		Connector 12-pin	
(12)	77.5	3.05	83.5	3.29	96.5	3.80
(13)	2	0.1	2	0.1	2	0.1
(14)	Ø33 h11	Ø(1.2992 / 1.2929)	Ø40 h11	Ø(1.5748 / 1.5685)	Ø54 h11	Ø(2.1260 / 2.1185)
(15)	Ø56	Ø2.2	Ø67	Ø2.64	Ø88	Ø3.5
(16)	$44^{\pm 0.1}$	$1.7^{\pm 0.004}$	$52^{\pm 0.1}$	$2.05.^{\pm 0.004}$	$72^{\pm 0.1}$	$2.8^{\pm 0.004}$
(17)	Ø26.1 H11	Ø(1.0327 / 1.0276)	Ø27.2 H8	Ø(1.0722 / 1.0709)	Ø40 H8	Ø(1.5763 / 1.5748)
(18)	–	–	Ø35.6 g6	Ø(1.4012 / 1.4006)	–	–
(19)	3	0.1	3	0.1	4	0.2
(20)	25	1.0	28.4	1.12	34.2	1.35
(21)	15	0.6	14.4	0.57	34.2	1.35
(22)	60°		50°		45°	
(23)	M30x1 LH		M40x1		M54x1	

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

T31, T32, T33, & T34 SPINDLE TORQUE TRANSDUCER (U.S. & METRIC)



T34 Dimensions

See Drawing	T34	
	CAPACITIES	
	Metric (Nm)	U.S. (lbf-in)
	150, 250, 500	1.33K, 2.21K, 4.43K
	mm	in
(1)	93	3.7
(2)	15	0.6
(3)	Ø64 H7	Ø2.5209 / 2.5197
(4)	M12	
(5)	Ø85	Ø3.3
(6)	Ø35	Ø1.4
(7)	14.5	0.59
(8)	21	0.8
(9)	26	1.02
(10)	130.5	5.14
(11)	Connector 12-pin	
(12)	115	4.5
(13)	2	0.1
(14)	Ø74	Ø2.9
(15)	Ø130^{-2}	Ø5.1$^{-0.08}$
(16)	106$^{\pm 0.1}$	4.2$^{\pm 0.004}$
(17)	Ø59.2	Ø2.33
(18)	Ø67.8	Ø2.67
(19)	10.2	0.40
(20)	24.5	1.0

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

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T31, T32, T33, & T34 SPINDLE TORQUE TRANSDUCER (U.S. & METRIC)

T34 Dimensions (CONTINUED)

See Drawing	T34	
	CAPACITIES	
	Metric (Nm)	U.S. (lbf-in)
	150, 250, 500	1.33K, 2.21K, 4.43K
	mm	in
(21)	M79x1.5	
(22)	35°	
(23)	1.9	0.07
(24)	Ø38	Ø1.5
(25)	Ø70 g6	Ø2.7556 / 2.7548
(26)	$13^{\pm 0.03}$	$0.5^{\pm 0.001}$
(27)	Ø10 D8	Ø(0.3961 / 0.3953)
(28)	DIN 5480	

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

TR1 ROD END REACTION TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

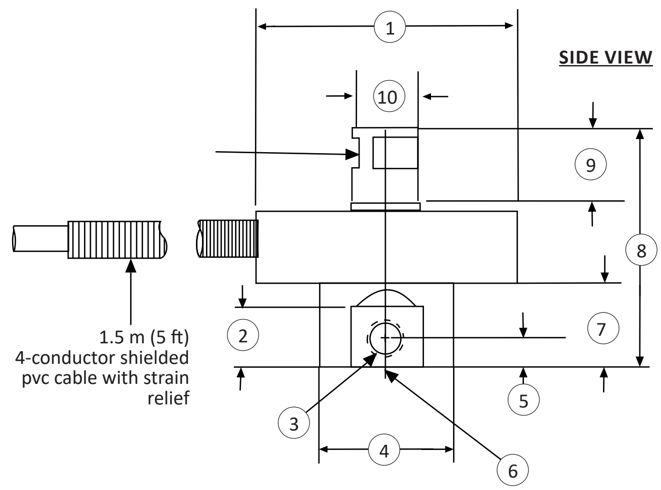
- Capacities from 25 ozf-in to 1K lbf-in (0.18 to 110 Nm)
- Small size
- Heavy-duty mounting

Specifications

ACCURACY – (MAX ERROR)			
Accuracy class – %FS			±0.2
Nonlinearity – %FS			±0.15
Hysteresis – %FS			±0.10
Nonrepeatability – %RO			±0.03
TEMPERATURE			
Operating Range		°F	-65 to +225
		°C	-55 to +107
Compensated Range		°F	+60 to +160
		°C	+16 to +71
Thermal Effects	Zero – %FS / °F		±0.005
	Span – % / °F		±0.005
ELECTRICAL			
Output – mV/V			2
Excitation Voltage – VDC			10
Excitation Voltage – V MAX			15
Input Resistance – Ohm – min			350
Output Resistance – Ohm – min			350
MECHANICAL			
Material			Stainless steel

STANDARD CONFIGURATION

Model TR1 (Shown)



Dimensions

See Drawing	CAPACITIES			
	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)
	25 (ozf-in) to 250 (lbf-in)	0.175 to 28	500 to 1K	56.5 to 113
	in	mm	in	mm
(1)	Ø1.5	Ø38	Ø2.0	Ø51
(2)	0.38	9.5	0.38	9.5
(3)	10-32 UNF-2B 3 Holes EQ. SP. for setscrew			
(4)	Ø0.75	Ø19	Ø1.25	32
(5)	0.19	4.9	0.19	4.9
(6)	Ø0.376 ↧ 0.015	Ø9.6 ↧ 0.38	Ø0.751	Ø19
(7)	0.50	13	0.50	13
(8)	1.50	38	1.50	38
(9)	0.50	13	0.50	13
(10)	Ø0.38	Ø9.5	Ø0.75	Ø19

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

FORCE MEASUREMENT SOLUTIONS.

TS11 FLANGE STYLE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 10 to 20K Nm (88.5 to 177K lbf-in)
- Compact
- Thru-hole design
- Threaded mounting holes

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Combined Error – %FS		± 0.1
Nonrepeatability – %		± 0.02
TEMPERATURE		
Effect on Zero – %RO / °C		±0.02
Effect on Output – % / °C		±0.01
Rated Range	°C	-5 to +45
	°F	+23 to +113
Operating Range	°C	-15 to +55
	°F	+5 to +131
ELECTRICAL		
Output–mV/V	10 Nm	0.5
	88.5 lbf-in	
	10 - 20K Nm	1.0
	221 - 177K lbf-in	
Excitation Voltage – VDC MAX		12
Bridge Resistance – Ohm		350
Electrical Connection – pin		6
MECHANICAL		
Safe Overload – %RO		150
Safe Overhung Moment – %FS		50
Deflection at Capacity – rod		0.003
Material		Alloy Steel

OPTIONS

- 100 % control signal (internal shunt cal)
- High accuracy to 0.05% FS
- A2LA accredited calibration
- Mating cable (straight or right angle)
- Extended Temperature range

STANDARD CONFIGURATION

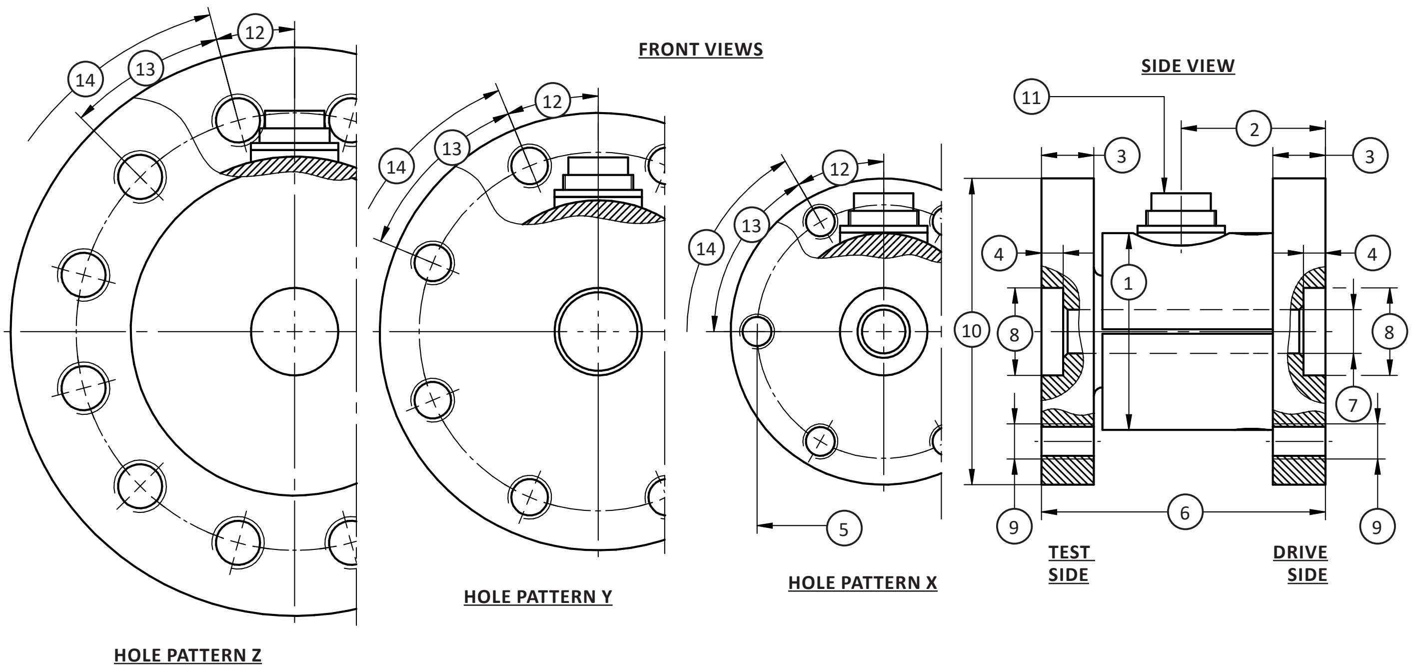
Model TS11 (Shown)

Electrical CONNECTION

Pin	6-PIN Electrical CONNECTION
	Function
1	Excitation (-)
2	Excitation (+)
3	Shield
4	Signal (+)
5	Signal (-)
6	Control signal (option)

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

TS11 FLANGE STYLE REACTION TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITY									
	Hole Pattern X		Hole Pattern Y		Hole Pattern Z		Hole Pattern Z		Hole Pattern Y	
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	10, 20, 50, 100, 200	88.5, 177, 443, 885, 1.77K	500, 1K	4.43K, 8.85K	2K	17K	5K	44.3K	10K, 20K	88.5K, 177K
	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	Ø45	Ø1.77	Ø60	Ø2.36	Ø80	Ø3.15	Ø80	Ø3.15	Ø145	Ø5.71
(2)	33	1.30	39.5	1.56	45	1.77	45	1.77	67.5	2.66
(3)	12	0.47	15	0.59	20	0.79	20	0.79	32	1.26
(4)	5	0.2	5	0.2	5	0.2	5	0.2	5	0.2
(5)	Ø58	Ø2.28	Ø82	Ø3.23	Ø100	Ø3.94	Ø100	Ø3.94	Ø210	Ø8.27
(6)	65	2.56	80	3.15	100	3.94	100	3.94	124	4.88
(7)	Ø10	Ø0.39	Ø18	Ø0.71	Ø20	Ø0.79	Ø20	Ø0.79	Ø105	Ø4.13
(8)	Ø20 H7	Ø(0.7874/ 0.7866)	Ø20 H7	Ø(0.7874/ 0.7866)	Ø75 H7	Ø(2.9528/ 2.9516)	Ø75 H7	Ø(2.9528/ 2.9516)	Ø105 H7	Ø(4.1139/ 4.1325)
(9)	M8, 6 places		M10, 8 places		M12, 12 places		M12, 12 places		M24, 8 places	
(10)	Ø70	Ø2.76	Ø100	Ø3.94	Ø130	Ø5.12	Ø130	Ø5.12	Ø260	Ø10.24
(11)	Connector 6-pin		Connector 6-pin		Connector 6-pin		Connector 6-pin		Connector 6-pin	
(12)	30°		22.5°		15°		15°		22.5°	
(13)	60°		45°		30°		30°		45°	
(14)	6 x 60°		8 x 45° (=360°)		12 x 30 (=360°)		12 x 30 (=360°)		8 x 45° (=360°)	

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FORCE MEASUREMENT SOLUTIONS.

TS11 FLANGE STYLE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

PERFORMANCE PARAMETERS

CAPACITY		SPRING RATE	MOMENT OF INERTIA ($kg \cdot m^2$)		MAX THRU.S.T LOAD**		MAX SHEAR FORCE**	
(Nm)	(lbf-in)	(NM/rad)	Drive Side	Test Side	(N)	(lbf)	(N)	(lbf)
10	88.5	$4.7x10^{2}$	$2.3x10^{-4}$	$2.0x10^{-4}$	920	207	85	19.1
20	177	$4.9x10^{3}$	$2.3x10^{-4}$	$2.0x10^{-4}$	970	218	90	20.2
50	443	$1.2x10^{4}$	$2.3x10^{-4}$	$2.0x10^{-4}$	2.1K	472	200	45.0
100	885	$2.7x10^{4}$	$2.3x10^{-4}$	$2.0x10^{-4}$	4.3K	967	450	101
200	1.77K	$4.7x10^{4}$	$2.3x10^{-4}$	$2.0x10^{-4}$	6.7K	1.51K	730	164
500	4.43K	$1.6x10^{5}$	$1.2x10^{-3}$	$1.0x10^{-3}$	12.5K	2.81K	1.6K	360
1K	8.85K	$3.1x10^{5}$	$1.2x10^{-3}$	$1.0x10^{-3}$	21K	4.72K	3K	674
2K	17.7K	$7.8x10^{5}$	$4.4x10^{-3}$	$4.0x10^{-3}$	42K	9.44K	5K	1.12K
5K	44.3K	$1.1x10^{6}$	$4.4x10^{-3}$	$4.1x10^{-3}$	60K	13.5K	8.5K	1.91K
10K	88.5K	$9.9x10^{6}$	$1.3x10^{-1}$	$5.3x10^{-2}$	70K	15.7K	15K	3.37K
20K	177K	$1.5x10^{7}$	$1.3x10^{-1}$	$5.4x10^{-2}$	96K	21.6K	30K	6.74K

TS12 SHAFT STYLE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 0.005 to 20K Nm (0.04 to 177K lbf-in)
- Stainless steel shafts
- Compact

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Combined Error – %FS		± 0.1
Nonrepeatability – %		± 0.02
TEMPERATURE		
Effect on Zero – %RO/ °C		±0.02
Effect on Output – % / °C		±0.01
Rated Range	°C	-5 to +45
	°F	+23 to +113
Operating Range	°C	-15 to +55
	°F	+5 to +131
ELECTRICAL		
Output – mV/V	0.005 to 0.1 Nm	0.5
	0.04 to 0.89 lbf-in	
	0.2 to 5K Nm	0.8
	1.77 to 44.3K lbf-in	
	10K to 20K Nm	1.5
	88.5K to 17.7K lbf-in	
Excitation Voltage – VDC MAX		12
Bridge Resistance – Ohm		1,000
Electrical Connection		6 or 7 pin
MECHANICAL		
Safe Overload – %RO	0.005 to 0.1 Nm	300
	0.04 to 0.89 lbf-in	
	0.2 to 5K Nm	200
	1.77 to 44.3K lbf-in	
	10K to 20K Nm	150
	88.5K to 17.7K lbf-in	
Safe Overhung Moment – %FS		50
Material	Shaft	Alloy steel
	HoU.S.ing	Aluminum

STANDARD CONFIGURATION

MODEL TS12 (Shown)

ELECTRICAL CONNECTION

6-PIN TS12 ELECTRICAL CONNECTION		7-PIN TS12 Electrical CONNECTION	
PIN	**FUNCTION**	**PIN**	**FUNCTION**
1	Excitation (-)	1	Excitation (-)
2	Excitation (+)	2	Excitation (+)
3	Shield	3	Shield
4	Signal (+)	4	Signal (+)
5	Signal (-)	5	Signal (-)
6	Cal. Control (Option)	6	Cal. Control (Option) Connect to Pin 2
		7	NC

OPTIONS

- 100% Control Signal (RCAL)
- Key DIN 6885-1

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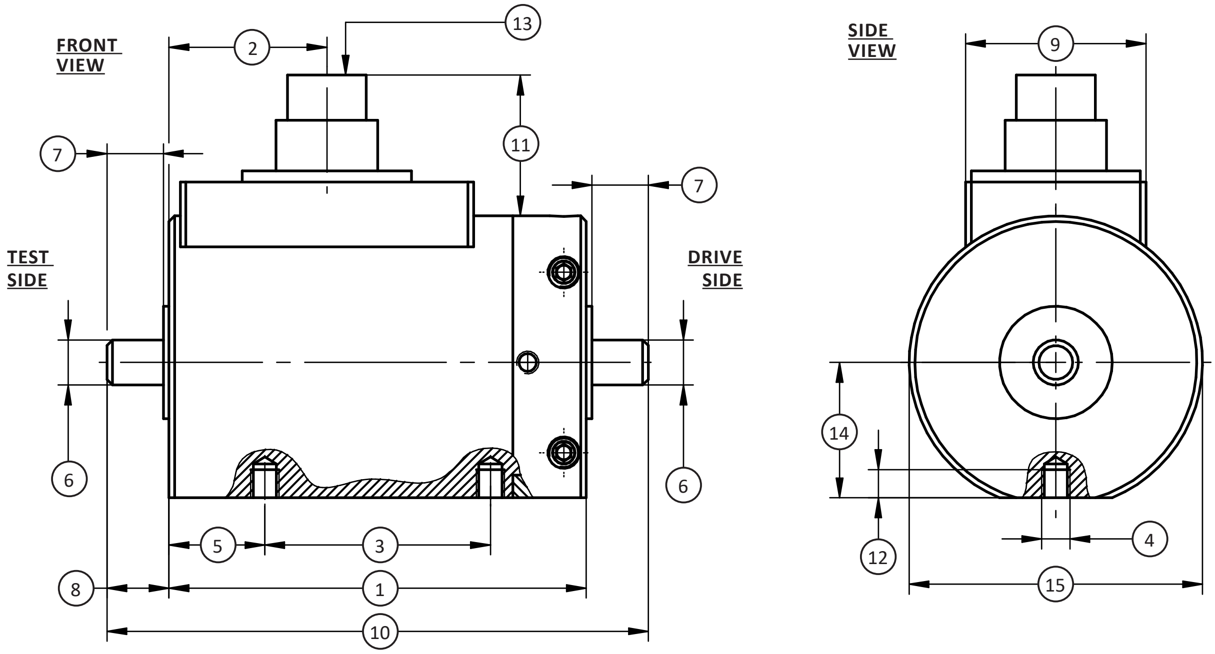
FORCE MEASUREMENT SOLUTIONS

TS12 SHAFT STYLE REACTION TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITY									
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	0.005, 0.001, 0.02	0.044, 0.089, 0.177	0.05	0.44	0.1, 0.2, 0.5, 1, 2, 5	0.85, 1.77, 4.43, 8.85, 17.7, 44.3	10	88.5	20	177
	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	37	1.6	48	1.9	48	1.9	48	1.9	73	2.9
(2)	14	0.6	25	1.0	25	1.0	25	1.0	40	1.6
(3)	20	0.8	–	–	–	–	–	–	–	–
(4)	M2.5		–		–		–		–	
(5)	8.5	0.33	–	–	–	–	–	–	–	–
(6)	Ø4 g6	Ø(0.1573/ 0.1570)	Ø6 g6	Ø(0.2361/ 0.2357)	Ø8 g6	Ø(0.3148/ 0.3148)	Ø10 g6	Ø(0.3935/ 0.3931)	Ø18 h6	Ø(0.7087/ 0.7082)
(7)	5	0.2	7	0.3	17	0.7	17	0.7	18	0.7
(8)	5.5	0.22	8	0.3	18	0.7	18	0.7	19	0.7
(9)	16	0.6	–	–	–	–	–	–	–	–
(10)	48	1.9	65	2.6	85	3.3	85	3.3	111.5	4.39
(11)	12.5	0.5	8	0.3	8	0.3	8	0.3	7	0.3
(12)	25	1.0	–	–	–	–	–	–	–	–
(13)	Connector 7-pin		Connector 7-pin		Connector 7-pin		Connector 7-pin		Connector 6-pin	
(14)	12	0.5	–	–	–	–	–	–	–	–
(15)	Ø26	Ø1.0	Ø32	Ø1.3	Ø32	Ø1.3	Ø32	Ø1.3	Ø51	Ø2.0

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TS12 SHAFT STYLE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

DIMENSIONS (CONTINUED)

See Drawing	CAPACITY									
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	50, 100	443, 885	200, 500	1.77K, 4.43K	1K	8.85K	2K, 5K	17K, 44.3K	10K, 20K	85.5K 177K
	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	73	2.9	79.5	3.1	107	4.2	107	4.2	140	5.5
(2)	40	1.6	40	1.6	53.5	2.1	53.5	2.1	53.5	2.1
(3)	–	–	–	–	–	–	–	–	–	–
(4)	–		–		–		–		–	
(5)	–	–	–	–	–	–	–	–	–	–
(6)	Ø18 h6	Ø(0.7087/ 0.7082)	Ø32 h6	Ø(1.2598/ 1.2592)	Ø50 h7	Ø(1.9685/ 1.9675)	Ø70 h7	Ø(2.7559/ 2.7549)	Ø110 h7	Ø(4.3307/ 4.3293)
(7)	36	1.4	38	1.5	58	2.3	110	4.3	120	4.7
(8)	37	1.5	40	1.6	66	2.6	126	5.0	160	6.3
(9)	–	–	–	–	–	–	–	–	–	–
(10)	147.5	5.81	159.5	6.28	262	10.3	377	14.8	470	18.5
(11)	7	0.3	7	0.3	8	0.3	8	0.3	8	0.3
(12)	–	–	–	–	–	–	–	–	–	–
(13)	Connector 6-pin		Connector 6-pin		Connector 6-pin		Connector 6-pin		Connector 6-pin	
(14)	–	–	–	–	–	–	–	–	–	–
(15)	Ø51	Ø2.0	Ø66	Ø2.6	Ø97	Ø3.8	Ø112	Ø4.4	Ø173	Ø6.8

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interface
FORCE MEASUREMENT SOLUTIONS.

TS12 SHAFT STYLE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

PERFORMANCE PARAMETERS

CAPACITY		Rated Characteristic Value [mV/V] ±0.1%	SPRING RATE	MOMENT OF INERTIA – J ($Kg•m^2$)		MAX THRU.S.T LOAD		MAX SHEAR FORCE	
Nm	lbf-in	in	NM/rad	Drive Side	Test Side	N	lbf	N	lbf
0.005	0.04	0.3	0.46	$3.9x10^{-6}$	$1.1x10^{-8}$	35	7.9	0.9	0.2
0.01	0.09	0.5	0.46	$3.9x10^{-6}$	$1.1x10^{-8}$	35	7.9	0.9	0.2
0.02	0.18	0.5	3.6	$3.9x10^{-6}$	$1.1x10^{-8}$	35	7.9	0.9	0.2
0.05	0.44	0.5	3.7	$1.1x10^{-5}$	$1.9x10^{-7}$	40	9.0	0.9	0.2
0.1	0.88	0.5	$1.8x10^{1}$	$1.1x10^{-5}$	$6.1x10^{-7}$	42	9.4	0.9	0.2
0.2	1.77	0.8	$1.8x10^{1}$	$1.1x10^{-5}$	$6.1x10^{-7}$	58	13.0	1.2	0.27
0.5	4.43	0.8	$9.7x10^{1}$	$1.1x10^{-5}$	$6.1x10^{-7}$	172	38.7	1.9	0.43
1	8.85	0.8	$1.2x10^{2}$	$1.1x10^{-5}$	$6.1x10^{-7}$	227	51.0	2.9	0.65
2	17.7	0.8	$3.6x10^{2}$	$1.1x10^{-5}$	$6.3x10^{-7}$	348	78.2	5.5	1.24
5	44.3	0.8	$4.1x10^{2}$	$1.1x10^{-5}$	$6.3x10^{-7}$	650	146	14	3.1
10	88.5	0.8	$9.1x10^{2}$	$1.1x10^{-5}$	$7.4x10^{-7}$	1K	245	26	5.8
20	177	0.8	$4.2x10^{3}$	$1.0x10^{-4}$	$7.0x10^{-6}$	1.68K	378	43	9.7
50	443	0.8	$6.1x10^{3}$	$1.1x10^{-4}$	$8.6x10^{-6}$	3.1K	697	80	18
100	885	0.8	$8.5x10^{3}$	$1.1x10^{-4}$	$8.8x10^{-6}$	4.8K	1.08K	160	36
200	1.77K	0.8	$6.6x10^{4}$	$3.6x10^{-4}$	$7.9x10^{-5}$	8K	1.8K	290	65.2
500	4.43K	0.8	$7.1x10^{4}$	$7.1x10^{-4}$	$8.0x10^{-5}$	14K	3.15K	700	157
1K	8.85K	0.8	$3.1x10^{5}$	$3.1x10^{-3}$	$1.1x10^{-3}$	23K	5.17K	900	202
2K	17.7K	0.8	$7.2x10^{5}$	$7.2x10^{-3}$	$4.1x10^{-3}$	33K	7.42K	1200	270
5K	44.3K	0.8	$8.0x10^{5}$	$8.0x10^{-3}$	$4.2x10^{-3}$	57K	12.8K	2800	629
10K	88.5K	1.5	$3.1x10^{6}$	$3.1x10^{-2}$	$3.0x10^{-2}$	90K	20.2K	4400	989
20K	177K	1.5	$3.7x10^{6}$	$3.7x10^{-2}$	$3.0x10^{-2}$	130K	29.2K	8200	1.84K

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TS14 SQUARE DRIVE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 1 to 5K Nm (8.85 to 44.2K lbf-in)
- Simple operation - no moving parts
- U.S.eful for auditing fastener torques
- Fits Standard socket wrenches

OPTIONS

- 100% Control Signal (Internal Shunt Cal)
- High accuracy +0.1%FS
- A2LA Accredited Calibration
- Mating Cable (straight or right angle)
- Extended Temperature Range

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Combined Error – %FS		± 0.2
Nonrepeatability – %		± 0.02
TEMPERATURE		
Effect on Zero – %RO / °C		±0.02
Effect on Output – % / °C		±0.01
Rated Range	°C	-5 to +45
	°F	+23 to +113
Operating Range	°C	-15 to +55
	°F	+5 to +131
ELECTRICAL		
Output–mV/V Nm		10.5
		≥ 21.0
Excitation Voltage – VDC MAX		12
Bridge Resistance – Ohm		350
Cable Length – m		3
MECHANICAL		
Safe Overload – %RO		150
Material		Alloy steel
Protection Class		IP50

STANDARD CONFIGURATION

MODEL TS14 (Shown)

Electrical CONNECTION

Wire	Function
green	Excitation (-)
brown	Excitation (+)
yellow	Signal (+)
white	Signal (-)
grey	Control signal (option)
Shield	Shield

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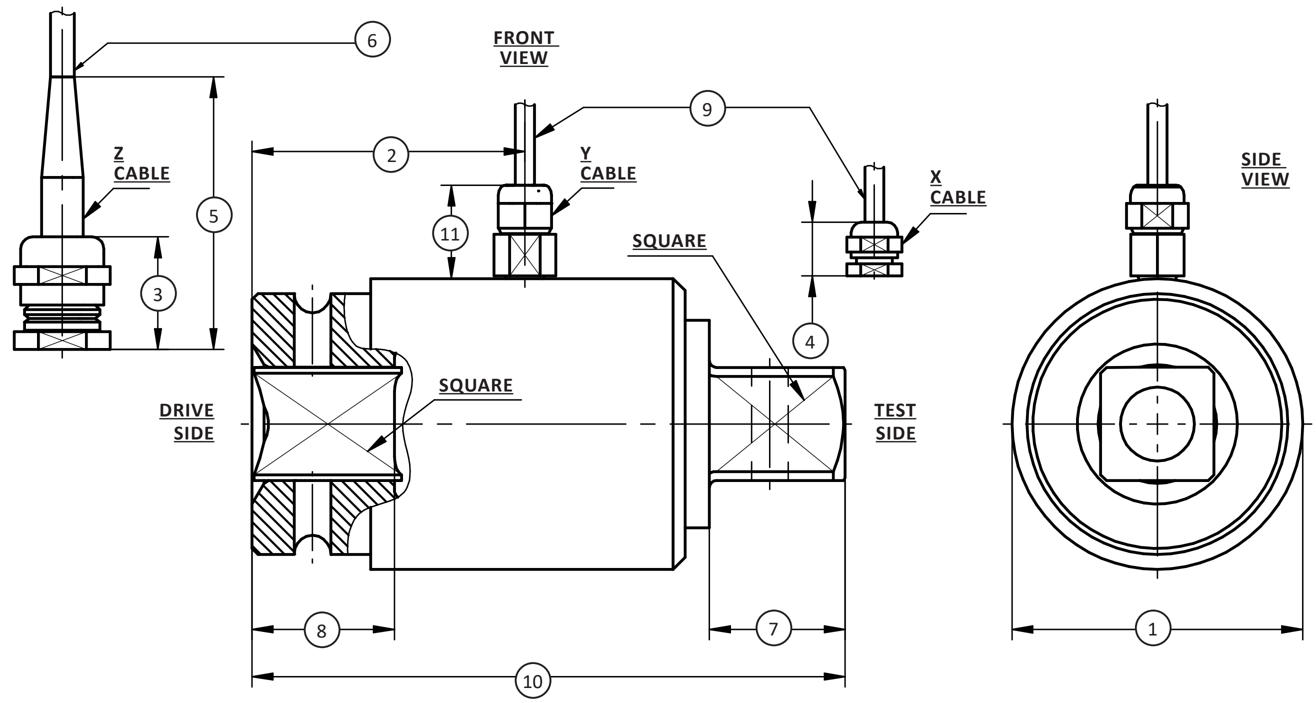
TS14 SQUARE DRIVE REACTION TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITY													
	X Cable		Y Cable								Z Cable			
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	1, 2, 5, 12	8.85, 17.7, 44.3, 106	25, 63	221, 560	100, 160, 200	885, 1.41K, 1.77K	500	4.42K	1K	8.85K	2K	17.K	5K	44.2K
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	Ø15	Ø0.6	Ø30	Ø1.2	Ø30	Ø1.2	Ø49	Ø1.9	Ø49	Ø1.9	Ø100	Ø3.9	Ø100	Ø3.9
(2)	22.7	0.89	34.5	1.36	35	1.4	46	1.8	60	2.4	120	4.7	120	4.7
(3)	–	–	–	–	–	–	–	–	–	–	20	0.8	20	0.8
(4)	10	0.4	–	–	–	–	–	–	–	–	–	–	–	–
(5)	–	–	–	–	–	–	–	–	–	–	50	2.0	50	2.0
(6)	–	–	–	–	–	–	–	–	–	–	4.8	0.19	4.8	0.19
(7)	7.2	0.28	10.4	0.41	15.1	0.59	22.9	0.90	27.4	1.08	39	1.5	39	1.5
(8)	8	0.3	12.2	0.48	15	0.6	24	0.9	27	1.1	41.5	1.63	41	1.6
(9)	3.2	0.13	3.2	0.13	3.2	0.13	3.2	0.13	3.2	0.13	–	–	–	–
(10)	64	2.5	71	2.8	76	3.0	100	3.9	132	5.2	250	9.8	250	9.8
(11)	–	–	14	0.6	14	0.6	14	0.6	14	0.6	–	–	–	–
SQUARE	1/4"		3/8"		1/2"		3/4"		1"		1 1/2"		1 1/2"	

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TS14 SQUARE DRIVE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

PERFORMANCE PARAMETERS

CAPACITY		SPRING RATE	MOMENT OF INERTIA – J (Kg•m²)		MAX THRU.S.T LOAD		MAX SHEAR FORCE	
Nm	lbf-in	NM/rad	Drive Side	Test Side	N	lbf	N	lbf
1	8.85	$2.1x10^2$	$2.4x10^{-7}$	$3.9x10^{-7}$	380	85.4	7	1.6
2	17.7	$2.1x10^2$	$2.4x10^{-7}$	$3.9x10^{-7}$	380	85.4	7	1.6
5	44.3	$5.5x10^2$	$2.6x10^{-7}$	$4.0x10^{-7}$	700	157	17	3.8
12	106	$6.9x10^2$	$2.6x10^{-7}$	$4.1x10^{-7}$	840	189	21.5	4.8
25	221	$4.7x10^3$	$9.6x10^{-6}$	$2.2x10^{-6}$	2.1K	472	83	18.7
63	558	$1.1x10^4$	$9.9x10^{-6}$	$2.5x10^{-6}$	3.9K	877	210	47.2
100	885	$1.8x10^4$	$1.3x10^{-5}$	$3.3x10^{-6}$	5.3K	1.19K	300	67.4
160	1.42K	$1.9x10^4$	$1.4x10^{-5}$	$3.4x10^{-6}$	5.5K	1.24K	320	71.9
200	1.77K	$1.9x10^4$	$1.4x10^{-5}$	$3.4x10^{-6}$	5.5K	1.24K	320	71.9
500	4.43K	$1.1x10^5$	$1.1x10^{-4}$	$3.3x10^{-5}$	14K	3.15K	1.1K	247
1K	8.85K	$1.2x10^5$	$2.4x10^{-4}$	$6.0x10^{-5}$	16.5K	3.71K	950	214
2K	17.7K	$4.6x10^5$	$4.6x10^{-3}$	$9.8x10^{-4}$	37K	8.32K	1.8K	405
5K	44.3K	$6.2x10^5$	$4.7x10^{-3}$	$1.1x10^{-3}$	55K	12.4K	3.4K	764

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

FORCE MEASUREMENT SOLUTIONS.

TS15 SQUARE FLANGE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 2 to 5K Nm (17.7 to 44.3K lbf-in)
- Compact
- Convenient flange mounting
- U.S.eful for checking torque wrenches

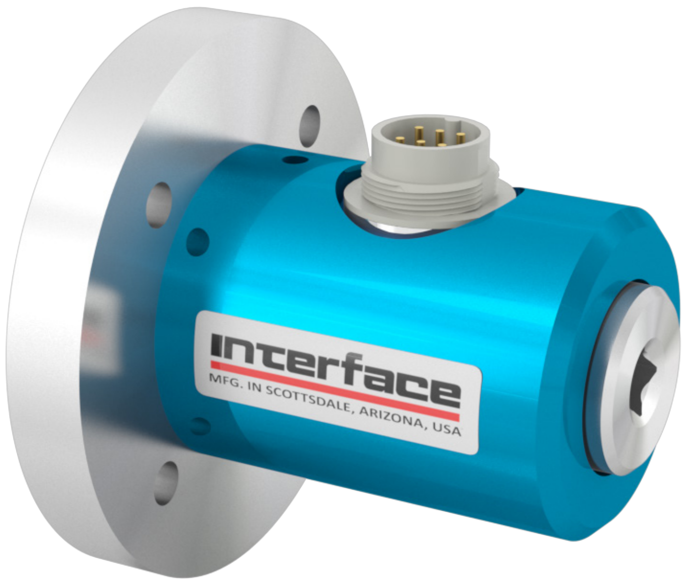
SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Combined Error – %FS		± 0.2
Nonrepeatability – %		± 0.02
TEMPERATURE		
Effect on Zero – %RO / °C		±0.02
Effect on Output – % / °C		±0.01
Rated Range	°C	-5 to +45
	°F	+23 to +113
Operating Range	°C	-15 to +55
	°F	+5 to +131
ELECTRICAL		
Output – mV/V		1
Excitation Voltage – VDC MAX		12
Bridge Resistance – Ohm		350
Electrical Connection		6-pin binder
MECHANICAL		
Safe Overload – %RO		150
Angular Deflection @ Rated Torque		< 0.2
Material		Alloy steel

OPTIONS

- 100% Control Signal (RCAL)
- Combined Error 0.1% FS

STANDARD CONFIGURATION



MODEL TS15 (Shown)

Electrical CONNECTION

Pin	6-PIN Electrical CONNECTION
	Function
1	Excitation (-)
2	Excitation (+)
3	Shield
4	Signal (+)
5	Signal (-)
6	Control signal (option)

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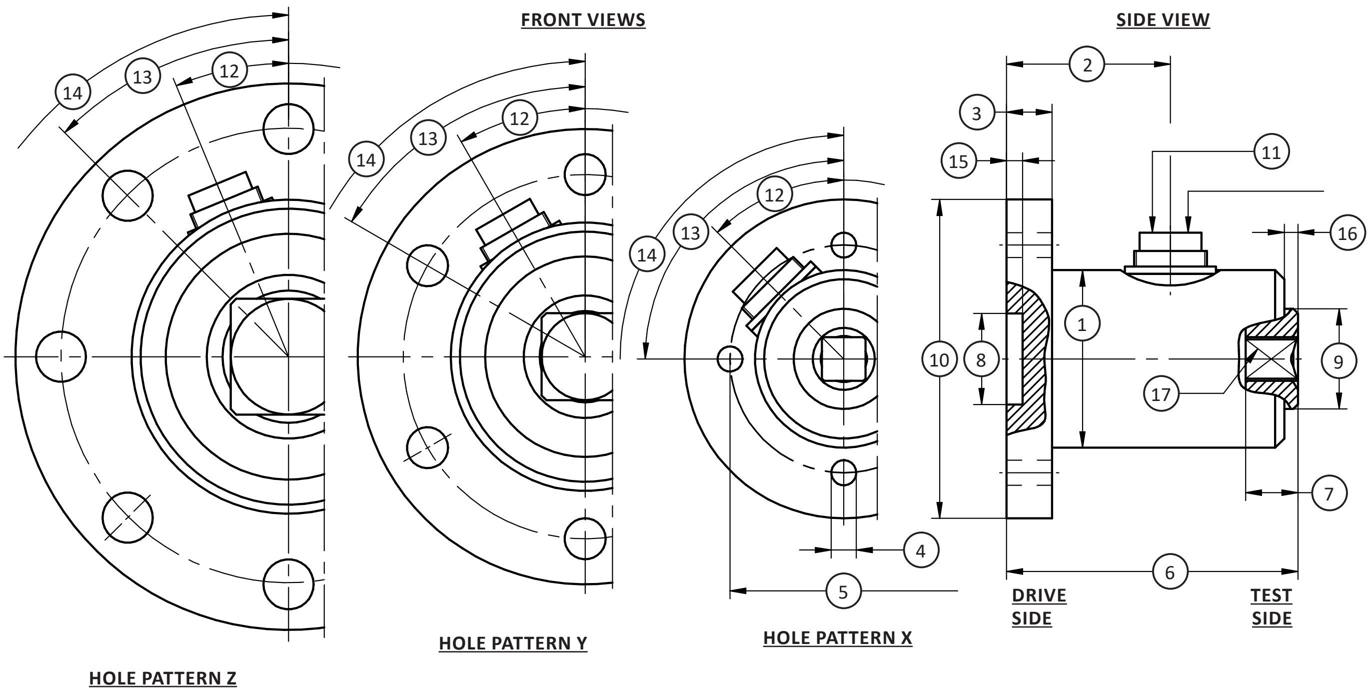
TS15 SQUARE FLANGE REACTION TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITY													
	Hole Pattern X		Hole Pattern X		Hole Pattern X		Hole Pattern Y		Hole Pattern Z		Hole Pattern Z		Hole Pattern Z	
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	2, 5, 12	17.7, 44.3, 106	25, 63	221, 558	100, 160, 200	885, 1.42K, 1.77K	500	4.43K	1K	8.85K	2K	17.7K	5K	44.3K
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	39.0	1.54	39.0	1.54	45.0	1.77	59.0	2.32	69.0	2.72	90.0	3.54	125.0	4.92
(2)	36	1.4	36	1.4	41	1.6	45	1.8	45	1.8	55	2.2	57	2.2
(3)	10	0.4	10	0.4	12	0.5	15	0.6	15	0.6	20	0.8	25	1.0
(4)	Ø5.5	Ø0.22	Ø5.5	Ø0.22	Ø6.6	Ø0.26	Ø9.0	Ø0.35	Ø11.0	Ø0.43	Ø13.0	Ø0.51	Ø17.0	Ø0.67
(5)	Ø50	Ø2.0	Ø50	Ø2.0	Ø60	Ø2.4	Ø80	Ø3.1	Ø100	Ø3.9	Ø120	Ø4.7	Ø170	Ø6.7
(6)	64	2.5	64	2.5	75	3.0	88	3.5	94	3.7	124.5	4.9	129.5	5.1
(7)	8	0.3	11.5	0.5	16	0.6	24	0.9	28.6	1.1	41.5	1.6	41.5	1.6
(8)	Ø20 H7	Ø(0.7882 / 0.7874)	Ø20 H7	Ø(0.7882 / 0.7874)	Ø20 H7	Ø(0.7882 / 0.7874)	Ø20 H7	Ø(0.7882 / 0.7874)	Ø20 H7	Ø(0.7882 / 0.7874)	Ø20 H7	Ø(0.7882 / 0.7874)	Ø105 H7	Ø(4.1352 / 4.1338)
(9)	Ø22	Ø0.9	Ø22	Ø0.9	Ø29.8	Ø1.14	Ø44	Ø1.7	Ø54	Ø2.1	Ø76	Ø3.0	Ø95	Ø3.7
(10)	Ø70	Ø2.8	Ø70	Ø2.8	Ø80	Ø3.1	Ø100	Ø3.9	Ø120	Ø4.7	Ø145	Ø5.7	Ø200	Ø7.9
(11)	Connector 6-pin		Connector 6-pin		Connector 6-pin		Connector 6-pin		Connector 6-pin		Connector 6-pin		Connector 6-pin	
(12)	45°		45°		45°		30°		22.5°		22.5°		22.5°	
(13)	90°		90°		90°		60°		45°		45°		45°	
(14)	4x90° (=360°)		4x90° (=360°)		4x90° (=360°)		6x60° (=360°)		8x45° (=360°)		8x45° (=360°)		8x45° (=360°)	
(15)	3.5	0.14	3.5	0.14	3.5	0.14	3.5	0.14	3.5	0.14	3.5	0.14	4	0.2
(16)	3	0.1	3	0.1	15	0.6	3	0.1	5	0.2	5	0.2	5	0.2
(17)	q 1/4"		3/8"		1/2"		3/4"		1"		1 1/2"		1 1/2"	

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

FORCE MEASUREMENT SOLUTIONS.

TS15 SQUARE FLANGE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

PERFORMANCE PARAMETERS

CAPACITY		SPRING RATE	MOMENT OF INERTIA – J (Kg•m²)		MAX THRU.S.T LOAD		MAX SHEAR FORCE	
Nm	lbf-in	NM/rad	Drive Side	Test Side	N	lbf	N	lbf
2	17.7	$2.2x10^{2}$	$2.1x10^{-4}$	$3.0x10^{-6}$	400	89.9	9	2.02
5	44.3	$7.5x10^{2}$	$2.1x10^{-4}$	$3.0x10^{-6}$	730	164	22	4.95
12	106	$2.2x10^{3}$	$2.1x10^{-4}$	$3.1x10^{-6}$	1.3K	292	51	11.5
25	221	$5.3x10^{3}$	$2.1x10^{-4}$	$1.6x10^{-6}$	2.1K	472	120	27
63	558	$1.4x10^{4}$	$2.2x10^{-4}$	$2.0x10^{-6}$	4K	899	270	60.7
100	885	$1.9x10^{4}$	$4.2x10^{-4}$	$1.4x10^{-5}$	5K	1.12K	300	67.4
160	1.42K	$3.6x10^{4}$	$4.2x10^{-4}$	$1.5x10^{-5}$	7.1K	1.6K	500	112
200	1.77K	$4.9x10^{4}$	$4.2x10^{-4}$	$1.6x10^{-5}$	8.6K	1.93K	680	153
500	4.43K	$1.2x10^{5}$	$1.3x10^{-3}$	$9.1x10^{-5}$	12K	2.7K	1600	360
1K	8.85K	$5.4x10^{5}$	$2.8x10^{-3}$	$2.4x10^{-4}$	21K	4.72K	2900	652
2K	17.7K	$1.1x10^{6}$	$8.0x10^{-3}$	$1.3x10^{-3}$	35K	7.87K	3900	877
5K	44.3K	$4.1x10^{6}$	$3.6x10^{-2}$	$4.0x10^{-3}$	63K	14.2K	8500	1.91K

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

interface
FORCE MEASUREMENT SOLUTIONS.

TS16 SQUARE FLANGE STYLE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 2 to 2K Nm (17.7 to 17.7K lbf-in)
- Convenient flange mounting
- Accepts Standard sockets

OPTIONS

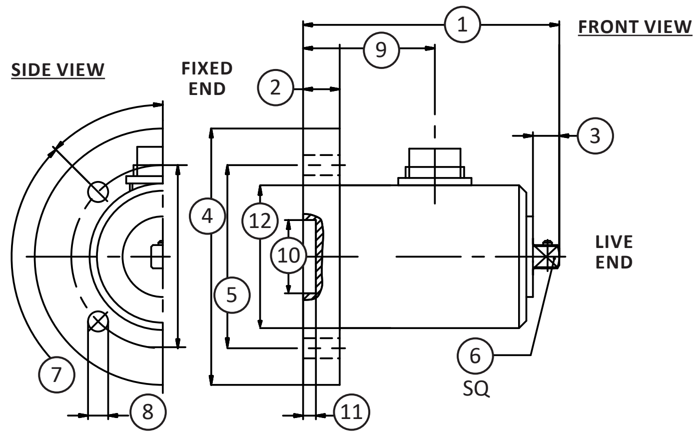
- 100% Control Signal (RCAL)
- Combined Error 0.1% FS

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Combined Error – %FS		±0.2
Nonrepeatability – %		±0.02
TEMPERATURE		
Effect on Zero – %RO / °C		±0.02
Effect on Output – % / °C		±0.01
Rated rRange	°C	-5 to +45
	°F	+23 to +113
Operating Range	°C	-15 to +55
	°F	+5 to +131
ELECTRICAL		
Output – mV/V		1
Excitation Voltage – VDC MAX		12
Bridge Resistance – Ohm		350
Electrical Connection		6-pin binder
MECHANICAL		
Safe Overload – %RO		150
Angular Deflection @ Rated Torque		< 0.2
Material		Alloy steel

STANDARD CONFIGURATION

MODEL TS16 (Shown)



Not oriented relative to mounting holes

DIMENSIONS

See Drawing	CAPACITY											
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	2, 5, 12	**17.7, 44.3, 106**	**25, 63**	**221, 1K**	**160**	**1.41K**	**500**	**4.43K**	**1K**	**8.85K**	**2K**	**17.7K**
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
1	70.0	2.76	70.0	2.76	90.0	3.54	120.0	4.72	140.0	5.51	180.0	7.09
2	10.0	0.39	10.0	0.39	12.0	0.47	15.0	0.59	15.0	0.59	20.0	0.79
3	7.2	0.28	10.4	0.41	15.1	0.59	22.6	0.89	27.4	1.08	39.3	1.55
4	70.0	2.76	70.0	2.76	80.0	3.15	100.0	3.94	120.0	4.72	145.0	5.71
5	50.0	1.97	50.0	1.97	60.0	2.36	80.0	3.15	100.0	3.94	120.0	4.72
6	¼		⅜		½		¾		1		1 ½	
7	4x90°		4x90°		4x90°		6x60°		8x45°		8x45°	
8	Ø5.5	Ø0.22	Ø5.5	Ø0.22	Ø6.6	Ø0.26	Ø9.0	Ø0.35	Ø11.0	Ø0.43	Ø13.0	Ø0.51
9	36.0	1.42	36.0	1.42	41.0	1.61	60.0	2.36	70.0	2.76	82.0	3.23
10	Ø20 H7	Ø2.5209 / 2.5197	Ø20 H7	Ø2.5209 / 2.5197	Ø20 H7	Ø2.5209 / 2.5197	Ø20 H7	Ø2.5209 / 2.5197	Ø20 H7	Ø2.5209 / 2.5197	Ø20 H7	Ø2.5209 / 2.5197
11	4.0	0.16	4.0	0.16	4.0	0.16	4.0	0.16	4.0	0.16	4.0	0.16
12	Ø39.0	Ø1.54	Ø40.0	Ø1.57	Ø45.0	Ø1.77	Ø49.0	Ø1.93	Ø59.0	Ø2.32	Ø70.0	Ø2.76

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

FORCE MEASUREMENT SOLUTIONS.

TS17 HEX DRIVE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 0.1 to 20 Nm (0.07 to 177 lbf-in)
- Simple operation - no moving parts
- U.S.eful for auditing fastener torques
- Quick-connect chuck

STANDARD CONFIGURATION

MODEL TS17 (Shown)

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Combined Error – %FS		± 0.1
Nonrepeatability – %		± 0.05
TEMPERATURE		
Effect on Zero – %RO / °C		±0.02
Effect on Output – % / °C		±0.01
Rated Range	°C	+5 to +50
	°F	+41 to +122
Operating Range	°C	-10 to +60
	°F	+14 to +140
ELECTRICAL		
Output – mV/V	0.2 - 5 Nm	1
	1.77 - 44.3 lbf-in	
	10 - 20 Nm	2
	88.5 - 177 lbf-in	
Excitation Voltage – VDC MAX		12
Bridge Resistance – Ohm		350
Cable Length – m		3
MECHANICAL		
Safe Overload – %RO		130
Material		Alloy steel

OPTIONS

- 100% Control Signal (RCAL)

Electrical CONNECTION

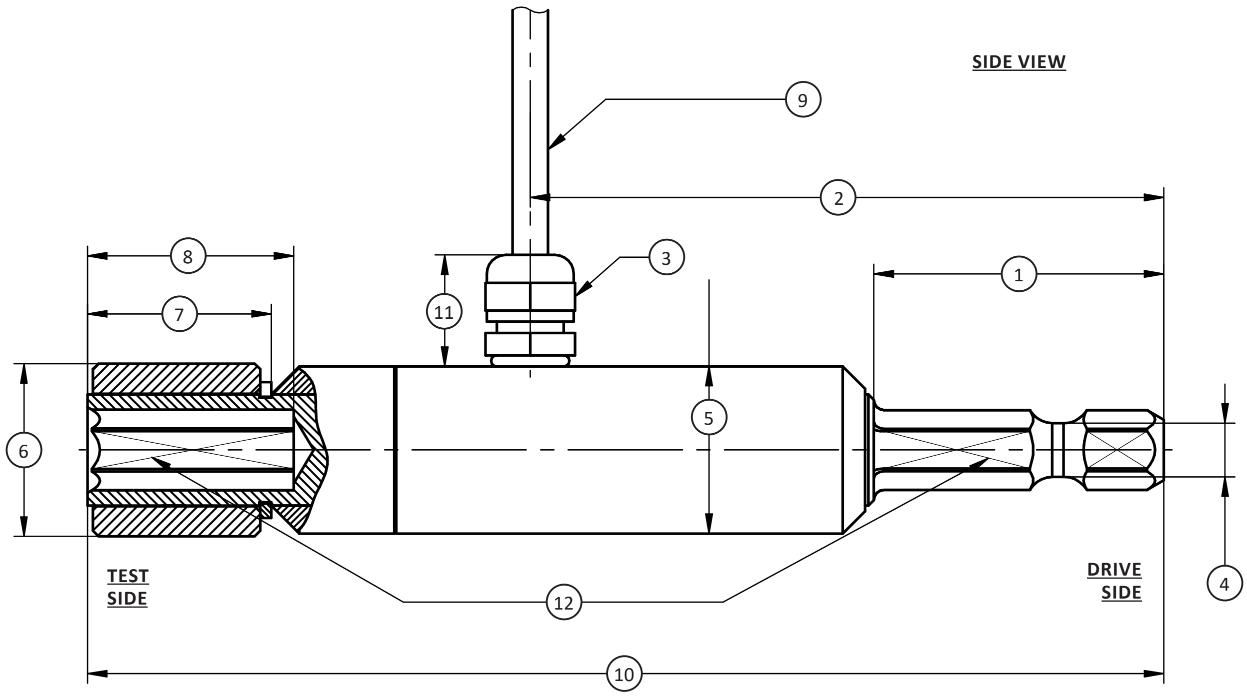
Wire	6-PIN Electrical CONNECTION
	Function
Green	Excitation (-)
Brown	Excitation (+)
Yellow	Shield
White	Signal (+)
Grey	Signal (-)
Shield	Control signal (option)

PERFORMANCE PARAMETERS

CAPACITY		SPRING RATE	MOMENT OF INERTIA – J (Kg•m²)		MAX THRU.S.T LOAD		MAX SHEAR FORCE	
Nm	**lbf-in**	**NM/rad**	**Drive Side**	**Test Side**	**N**	**lbf**	**N**	**lbf**
0.1	0.89	$1.8x10^{1}$	$6.7x10^{-7}$	$5.7x10^{-7}$	43	9.7	0.6	0.13
0.2	1.78	$1.8x10^{1}$	$6.7x10^{-7}$	$5.7x10^{-7}$	43	9.7	0.6	0.13
0.5	4.43	$1.1x10^{2}$	$6.7x10^{-7}$	$5.7x10^{-7}$	95	21.4	1.2	0.27
1	8.85	$1.1x10^{2}$	$6.7x10^{-7}$	$5.7x10^{-7}$	380	85.4	3.7	0.83
2	17.7	$1.9x10^{2}$	$6.8x10^{-7}$	$5.7x10^{-7}$	380	85.4	3.7	0.83
5	44.3	$3.7x10^{2}$	$6.9x10^{-7}$	$5.8x10^{-7}$	700	157	9.5	2.14
10	88.5	$3.7x10^{2}$	$6.9x10^{-7}$	$5.8x10^{-7}$	1.15K	259	19	4.3
20	177	$4.8x10^{2}$	$7.1x10^{-7}$	$6.0x10^{-7}$	1.15K	259	19	4.3

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

TS17 HEX DRIVE REACTION TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITY	
	Metric (Nm)	U.S. (lbf-in)
	0.1, 0.2, 0.5, 1, 2, 5, 10, 20	0.07, 0.15, 0.37, 0.7, 1.5, 3.7, 88.5, 177
	mm	in
(1)	$26^{+0.2}$	$1.0^{+0.008}$
(2)	57	2.2
(3)	SW 8	
(4)	$\varnothing 4.8^{-0.1}$	$\varnothing 0.19^{-0.004}$
(5)	Ø15	Ø0.6
(6)	Ø15.5	Ø0.61
(7)	16.5	0.65
(8)	18.5	0.73
(9)	Ø3.2	Ø0.13
(10)	96.5	3.80
(11)	10	0.4
(12)	⬡1/4"	

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

TS18 SHAFT TO FLANGE STYLE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 5 to 2K Nm (44.3 to 17.7K lbf-in)
- Keyed shaft per DIN 6885.1
- Convenient flange mounting

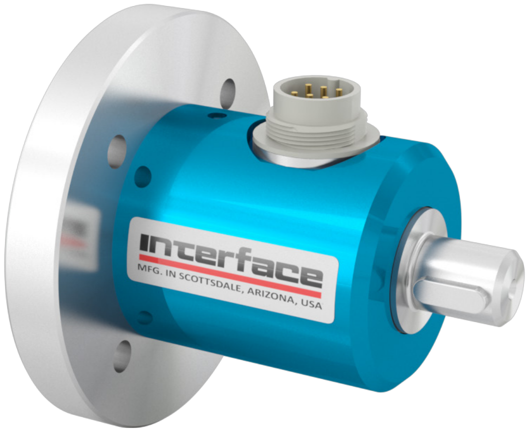
OPTIONS

- 100% Control Signal (RCAL)
- Combined Error 0.1% FS

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Combined Error – %FS		± 0.2
Nonrepeatability – %		± 0.02
TEMPERATURE		
Effect on Zero – %RO/ ºC		±0.02
Effect on Output – % / ºC		±0.01
Rated Range	°C	-5 to +45
	°F	+23 to +113
Operating Range	°C	-15 to +55
	°F	+5 to +131
ELECTRICAL		
Output – mV/V		1
Excitation Voltage – VDC MAX		12
Bridge Resistance – Ohm		350
Electrical Connection		6-pin binder
MECHANICAL		
Safe Overload – %RO		150
Angular Deflection @ Rated Torque		< 0.2
Material		Alloy steel

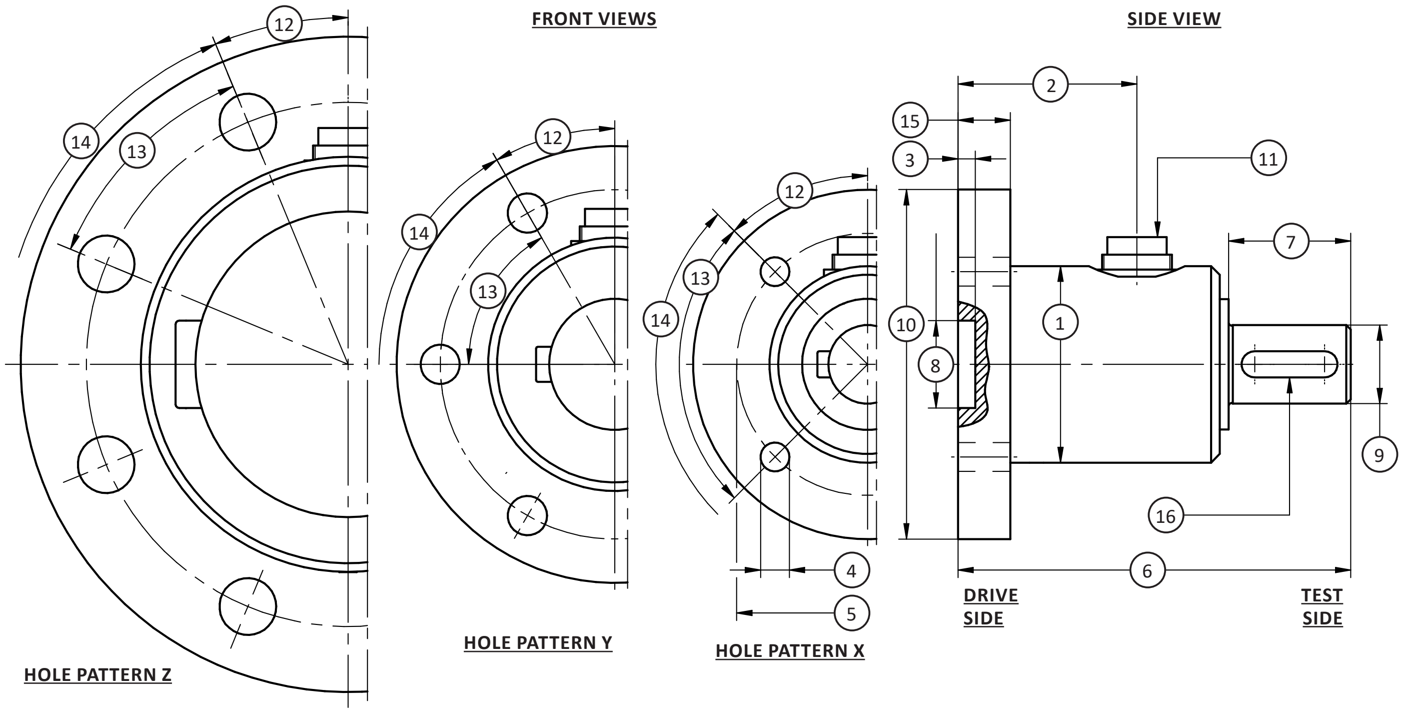
STANDARD CONFIGURATION



MODEL TS18 (Shown)

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

TS18 SHAFT TO FLANGE STYLE REACTION TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITY									
	Hole Pattern X		Hole Pattern X		Hole Pattern Y		Hole Pattern Y		Hole Pattern Z	
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	2, 5, 10, 20	17.7, 44.3, 88.5, 177	50, 100	443, 885	200, 500	1.77K, 4.43K	1K	8.85K	2K	17.7K
	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	Ø40	Ø1.6	Ø45	Ø1.8	Ø58	Ø2.3	Ø65	Ø2.6	Ø95	Ø3.7
(2)	36	1.4	41	1.6	43	1.7	41	1.6	46	1.8
(3)	3.5	0.14	3.5	0.14	3.5	0.14	3.5	0.14	3.5	0.14
(4)	Ø5.5	Ø0.22	Ø6.6	Ø0.26	Ø9	Ø0.4	Ø11	Ø0.4	Ø13	Ø0.5
(5)	Ø50	Ø2.0	Ø60	Ø2.4	Ø80	Ø3.1	Ø100	Ø3.9	Ø120	Ø4.7
(6)	70	2.8	90	3.5	120	4.7	140	5.5	165	6.5
(7)	15	0.6	28	1.1	50	2.0	70	2.8	90	3.5
(8)	Ø20 H7	Ø(0.7882 / 0.7874)	Ø20 H7	Ø(0.7882 / 0.7874)	Ø20 H7	Ø(0.7882 / 0.7874)	Ø20 H7	Ø(0.7882 / 0.7874)	Ø20 H7	Ø(0.7882 / 0.7874)
(9)	Ø12 g6	Ø(0.4722 / 0.4718)	Ø18 g6	Ø(0.7084 / 0.7080)	Ø30 g6	Ø(1.1808 / 1.1803)	Ø40 g6	Ø(1.5744 / 1.5738)	Ø70 g6	Ø(2.7555 / 2.7548)
(10)	Ø70	Ø2.8	Ø80	Ø3.1	Ø100	Ø3.9	Ø120	Ø4.7	Ø150	Ø5.9
(11)	Connector 6-pin		Connector 6-pin		Connector 6-pin		Connector 6-pin		Connector 6-pin	
(12)	45°		45°		30°		30°		22.5°	
(13)	90°		90°		60°		60°		45°	
(14)	4x90° (=360°)		4x90° (=360°)		4x60° (=360°)		6x60° (=360°)		8x45° (=360°)	
(15)	10	0.4	12	0.5	15	0.6	15	0.6	20	0.8
(16)	Key DIN 6885-1		Key DIN 6885-1		Key DIN 6885-1		Key DIN 6885-1		Key DIN 6885-1	

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

TS19 SHORT HOLLOW FLANGE STYLE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 50 to 10K Nm (443 to 88.5K lbf-in)
- Short, rugged, compact design
- Both ends with flange
- Thru-Hole

STANDARD CONFIGURATION

Model TS19 (Shown)

OPTIONS

- 100% Control Signal (Internal shunt cal)
- High accuracy to 0.05% FS
- A2LA accredited calibration
- Mating cable (straighter or right angle)
- Extended Temperature range

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Combined Error – %FS		± 0.1
Nonrepeatability – %		± 0.02
TEMPERATURE		
Effect on Zero – %RO/ °C		±0.02
Effect on Output – % / °C		±0.01
Rated Range – °C		-5 to +45
Operating Range – °C		-15 to +55
ELECTRICAL		
Output – mV/V	50 Nm	0.5
	443 lbf-in	
	100 - 10K Nm	1.0
	885 - 88.5K lbf-in	
Excitation Voltage – VDC MAX		12
Bridge Resistance – Ohm		2,000
Electrical Connection		7-Pin Binder 712
MECHANICAL		
Safe Overload – %RO		150
Safe Overhung Moment – %FS		50
Material		Alloy steel
Protection Level		IP54

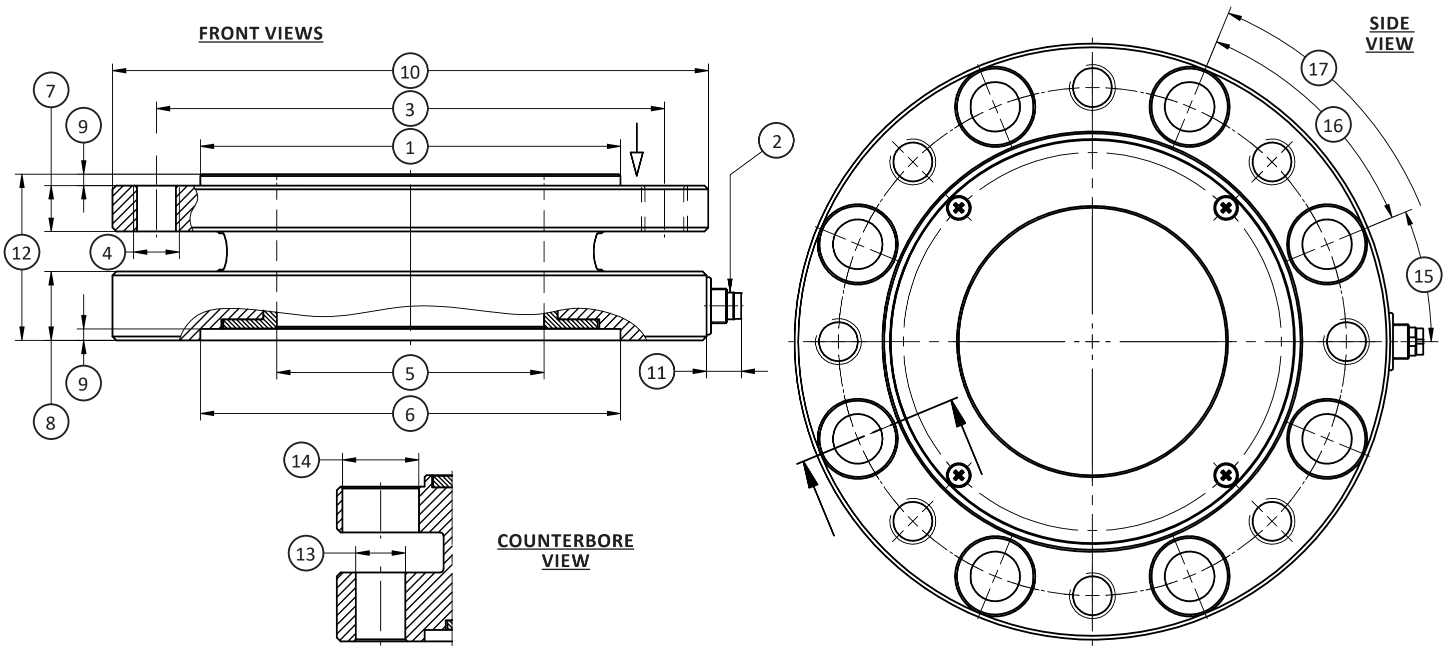
PERFORMANCE PARAMETERS

CAPACITY		SPRING RATE	MOMENT OF INERTIA – (Kg•m²)		MAX THRU.S.T LOAD		MAX SHEAR LOAD		SHEAR FORCE	
Nm	lbf-in	NM/rad	Drive Side	Test Side	N	lbf	N	lbf	N	lbf
50	443	$2.0x10^5$	$1.1x10^3$	$4.0x10^4$	600	135	280	62.9	280	62.9
100	885	$2.0x10^5$	$1.1x10^3$	$4.0x10^4$	600	135	280	62.9	280	62.9
200	1.77K	$3.6x10^5$	$2.5x10^3$	$1.0x10^3$	920	207	400	89.9	400	89.9
500	4.43K	$1.2x10^6$	$7.4x10^3$	$3.4x10^3$	2.1K	472	620	139	620	139
1K	8.85K	$2.1x10^6$	$7.4x10^3$	$3.4x10^3$	2.8K	629	1200	270	1.2K	270
2K	17.7K	$6.2x10^6$	$1.6x10^2$	$9.1x10^3$	3.8K	854	1900	427	1.9K	427
5K	44.3K	$1.3x10^7$	$6.5x10^2$	$4.2x10^2$	6.6K	1.48K	5200	1.17K	5.2K	1.17K
10K	88.5K	$2.6x10^7$	$6.5x10^2$	$4.2x10^2$	8.1K	1.82K	9000	2.02K	9K	2.02K

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

INTERFACE
FORCE MEASUREMENT SOLUTIONS.

TS19 SHORT HOLLOW FLANGE STYLE REACTION TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITIES									
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	50, 100	443, 885	200	1.77K	500, 1K	4.43K, 8.85K	2K	17.7K	5K, 10K	44.3K, 88.5K
	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	Ø75 g6	Ø(2.9524 / 2.9516)	Ø90 g6	Ø(3.5035 / 3.5420)	Ø110 g6	Ø(4.33022 / 4.3294)	Ø140 g6	Ø(5.5112 / 5.5103)	Ø174 g6	Ø(6.8498 / 6.8488)
(2)	Connector 7-pin		Connector 7-pin		Connector 7-pin		Connector 7-pin		Connector 7-pin	
(3)	Ø87	Ø3.4	Ø105	Ø4.1	Ø133	Ø5.2	Ø165	Ø6.5	Ø206	Ø8.1
(4)	8 x M6		8 x M8		8 x M12		8 x M14		8 x M18	
(5)	Ø40	Ø1.6	Ø45	Ø1.8	Ø70	Ø2.8	Ø75	Ø3.0	Ø79	Ø3.1
(6)	Ø75 H7	Ø(2.9539 / 2.9527)	Ø90	Ø(3.5447 / 3.5433)	Ø110	Ø(4.3321 / 4.3307)	Ø140	Ø(5.5134 / 5.5118)	Ø174	Ø(6.8519 / 6.8504)ww
(7)	6	0.2	8	0.3	12	0.5	14	0.6	20	0.8
(8)	16	0.6	17	0.7	18	0.7	18	0.7	29	1.1
(9)	3	0.1	3	0.1	3	0.1	3	0.1	3	0.1
(10)	Ø100	Ø3.9	Ø121	Ø4.8	Ø156	Ø6.1	Ø191	Ø7.5	Ø238	Ø9.4
(11)	9	0.4	9	0.4	9	0.4	9	0.4	9	0.4
(12)	33	1.3	38.5	1.5	43.5	1.7	45.5	1.8	67	2.6
(13)	Ø6.4	Ø0.25	Ø8.4	Ø0.3	Ø13	Ø0.5	Ø15	Ø0.6	Ø	Ø0.7
(14)	Ø11	Ø0.4	Ø14	Ø0.6	Ø20	Ø0.8	Ø24	Ø0.9	Ø30	Ø1.2
(15)	22.5º		22.5º		22.5º		22.5º		22.5º	
(16)	45º		45º		45º		45º		45º	
(17)	8 x 45º		8 x 45º		8 x 45º		8 x 45º		8 x 45º	

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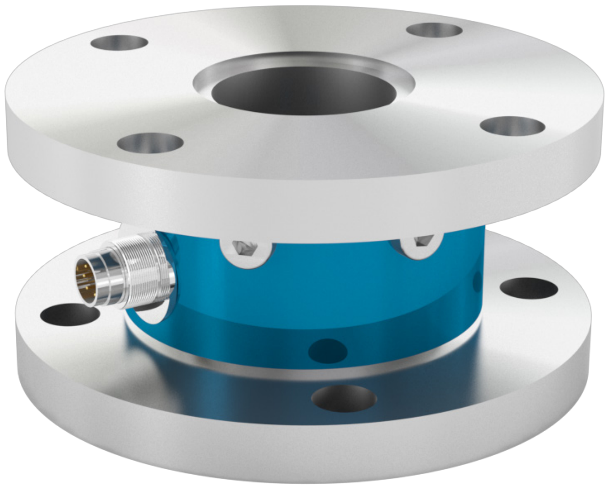
FORCE MEASUREMENT SOLUTIONS.

TS20 HOLLOW FLANGE STYLE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 10 to 200 Nm (88.5 to 1.77K lbf-in)
- Very short axial length
- Thru-hole

STANDARD CONFIGURATION



Model TS20 (Shown)

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.1
Hysteresis – %FS		±0.1
Nonrepeatability – % RO		±0.02
TEMPERATURE		
Effect on Zero – %RO/ °C		±0.02
Effect on Output – % / °C		±0.01
Compensated Range	°C	-5 to +45
	°F	+23 to +113
Operating Range	°C	-15 to +55
	°F	+5 to +131
ELECTRICAL		
Output – mV/V ± %		1 ± 0.1
Excitation Voltage – VDC		2-12
Bridge Resistance – Ohm		350
Electrical Connection		7-pin Binder
MECHANICAL		
Safe Overload – %RO		150
Protection Level		IP50

OPTIONS

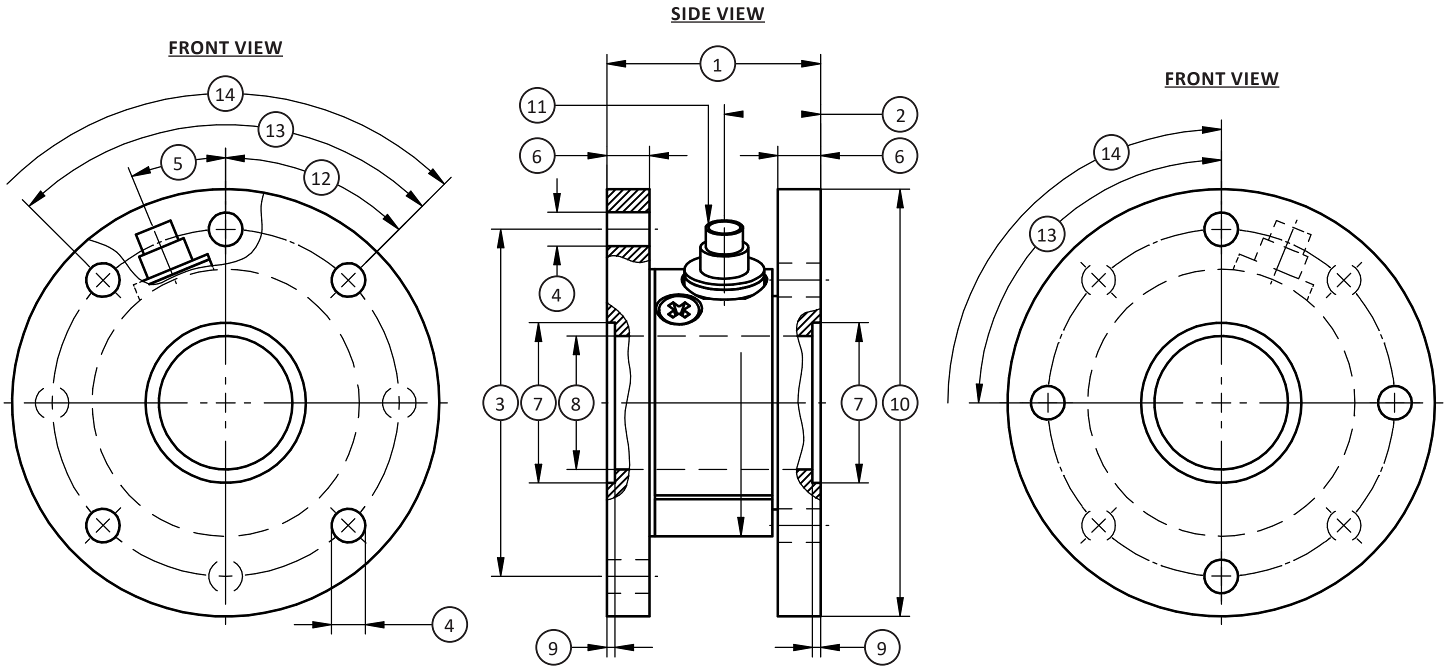
- High accuracy to 0.05% FS
- 100% control signal (internal shunt cal)
- Extended Temperature range
- A2LA accredited calibration
- Mating cable (straight or right angle)

PERFORMANCE PARAMETERS

CAPACITY		SPRING RATE	MASS MOMENT OF INERTIA – (Kg•m²)		MAX THRU.S.T LOAD		MAX SHEAR LOAD	
Nm	lbf-in	NM/rad	Drive Side	Test Side	N	lbf	N	lbf
10	88.5	$6.77x10^3$	$1.08x10^{-4}$	$8.83x10^{-5}$	1.1K	247	190	42.7
20	177	$1.28x10^4$	$1.08x10^{-4}$	$8.83x10^{-5}$	1.6K	360	380	85.4
50	443	$5.15x10^4$	$1.10x10^{-4}$	$8.87x10^{-5}$	3.1K	697	850	191
100	885	$9.44x10^4$	$2.83x10^{-4}$	$2.56x10^{-4}$	2.5K	562	600	135
200	1.77K	$1.97x10^5$	$2.84x10^{-4}$	$2.57x10^{-4}$	4.2K	944	1.2K	270

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

TS20 HOLLOW FLANGE STYLE REACTION TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITIES			
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	10, 20, 50	88.5, 177, 443	100, 200	885, 1.77K
	mm	in	mm	in
(1)	40	1.6	40	1.6
(2)	18	0.7	18	0.7
(3)	Ø65	Ø2.6	Ø65	Ø2.6
(4)	Ø6.3	Ø0.25	Ø8.3	Ø0.33
(5)	22.5°		22.5°	
(6)	8	0.3	8	0.3
(7)	Ø30 H7	Ø(1.1819 / 1.1811)	Ø30 H7	Ø(1.1819 / 1.1811)
(8)	Ø25	Ø1.0	Ø25	Ø1.0
(9)	1.5	0.06	1.5	0.06
(10)	Ø80	Ø3.1	Ø80	Ø3.1
(11)	Connector 7-pin		Connector 7-pin	
(12)	45°		45°	
(13)	90º		90º	
(14)	4 x 90º (=360°)		4 x 90º (=360°)	

Note:
4 mounting holes per flange 45º offset

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TS21 MINIATURE SHAFT STYLE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

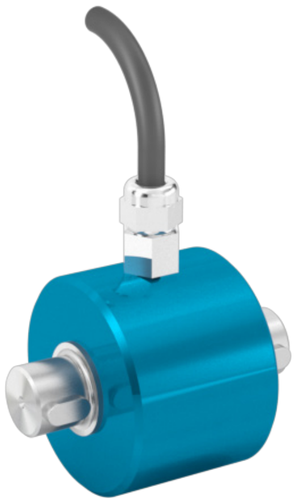
FEATURES & BENEFITS

- Capacities from 1 to 100 Nm (8.85 to 885 lbf-in)
- Shaft ends with keys
- Very small measuring ranges

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.2
Hysteresis – %FS		±0.2
Nonrepeatability – %RO		±0.01
TEMPERATURE		
Effect on Zero – %RO / °C		±0.02
Effect on Output – % / °C		±0.01
Compensated Range	°C	-5 to +45
	°F	+23 to +113
Operating Range	°C	-15 to +55
	°F	+5 to +131
ELECTRICAL		
Output – mV/V		1
Excitation Voltage – VDC		2 - 12
Bridge Resistance – Ohm		350
Electrical Connection	m	3
	ft	9.8
MECHANICAL		
Safe Overload – %RO		150
Angular Deflection at Rated Torque		< 0.2
IP Rating		50
Material		Alloy steel

STANDARD CONFIGURATION



MODEL TS21 (Shown)

OPTIONS

- Enhanced Accuracy – 0.1% nonlinearity & hysteresis
- Internal Shunt Resistor – 100% output

Electrical CONNECTION

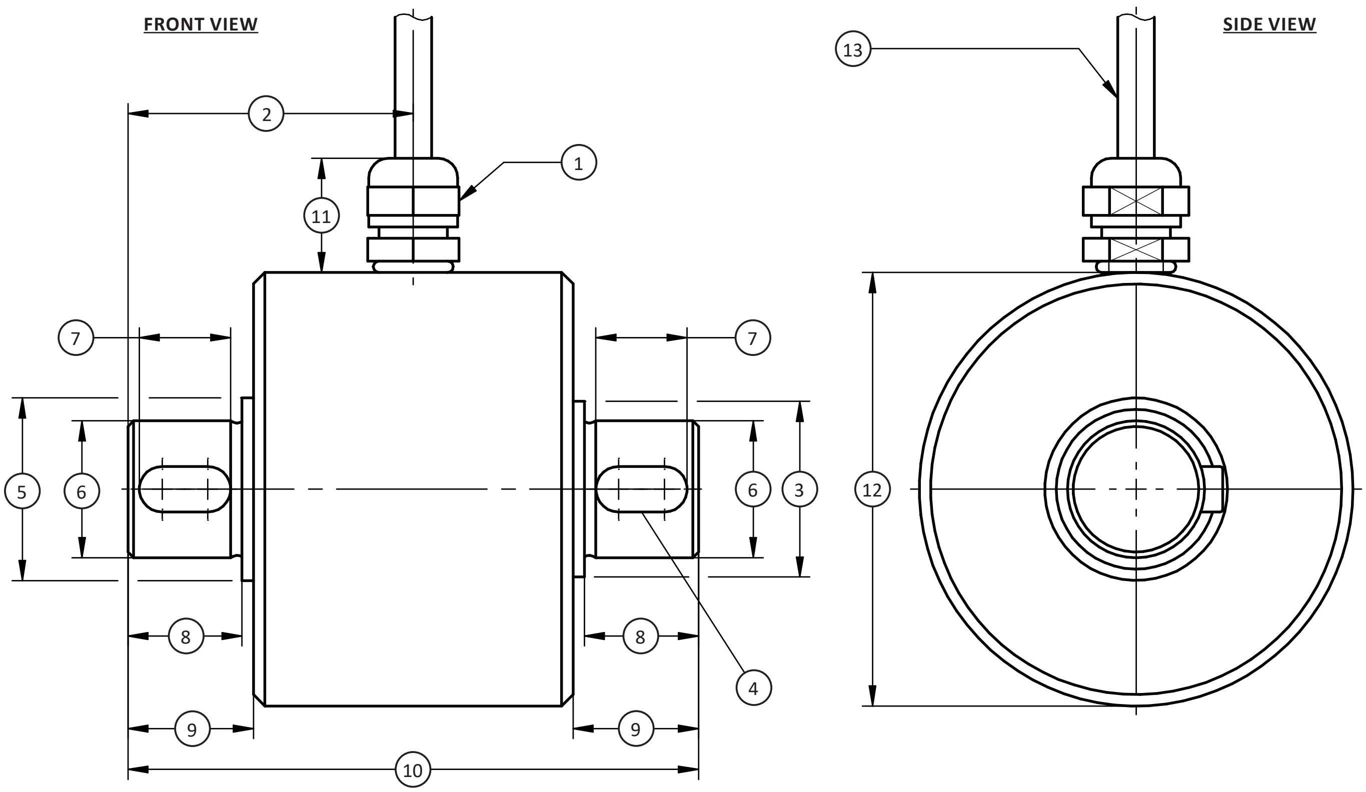
Wire	6-PIN Electrical CONNECTION
	Function
Green	Excitation (-)
Brown	Excitation (+)
Yellow	Signal (+)
White	Signal (-)
Grey	Control signal (option)
Shield	Shield

PERFORMANCE PARAMETERS

CAPACITY		SPRING RATE	MASS MOMENT OF INERTIA – (Kg•m²)		MAX THRU.S.T LOAD		MAX SHEAR LOAD	
Nm	**lbf-in**	**Nm/rad**	**Drive Side**	**Test Side**	**N**	**lbf**	**N**	**lbf**
1	8.85	$2.78x10^{2}$	$1.10x10^{-5}$	$3.78x10^{-7}$	400	89.9	11	2.5
2	17.7	$2.78x10^{2}$	$1.10x10^{-5}$	$3.78x10^{-7}$	400	89.9	11	2.5
5	44.3	$8.03x10^{2}$	$1.10x10^{-5}$	$3.86x10^{-7}$	700	157	25	5.6
10	88.5	$3.22x10^{3}$	$1.10x10^{-5}$	$4.07x10^{-7}$	1.15K	259	51	11.5
20	177	$3.50x10^{3}$	$1.11x10^{-5}$	$4.47x10^{-7}$	1.7K	382	95	21.4
50	443	$1.17x10^{4}$	$3.24x10^{-5}$	$4.44x10^{-6}$	3.7K	832	190	42.7
100	885	$1.55x10^{4}$	$3.26x10^{-5}$	$4.63x10^{-6}$	4.35K	978	270	60.7

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

TS21 MINIATURE SHAFT STYLE REACTION TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITY			
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	1, 2, 5, 10, 20	8.85, 17.7, 44.3, 88.5, 177	50, 100	443, 885
	mm	in	mm	in
(1)	SW 8		SW 8	
(2)	25	1.0	35	1.4
(3)	Ø15.4	Ø0.61	Ø20.5	Ø0.81
(4)	Key DIN 6885-1		Key DIN 6885-1	
(5)	Ø16	Ø0.6	Ø21	Ø0.8
(6)	Ø12 g6	Ø0.4722 / 0.4718	Ø18 g6	Ø0.7084 / 0.7080
(7)	8	0.3	18	0.7
(8)	10	0.4	20	0.8
(9)	11	0.4	21.5	0.8
(10)	50	2.0	70	2.8
(11)	10	0.4	10	0.4
(12)	Ø38	Ø1.5	Ø49	Ø1.9
(13)	Ø3.2	Ø0.13	Ø3.2	Ø0.13

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TS22 MINIATURE REACTION TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 0.005 to 20 Nm (0.04 to 177 lbf-in)
- 5X safe overload on capacities up to 2 Nm (17.7 lbf-in)
- Very small measuring ranges

STANDARD CONFIGURATION

MODEL TS22 (Shown)

OPTIONS

- Enhanced Accuracy – 0.05% FS
- 100% control signal (internal shunt cal)
- Special Temperature range

ACCESSORIES

- Mating cable
- Instrumentation

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.2
Hysteresis – %FS		±0.2
Nonrepeatability – %RO		±0.02
TEMPERATURE		
Effect on Zero – %RO / °C		±0.02
Effect on Output – % / °C		±0.01
Compensated Range	°C	-5 to +45
	°F	+23 to +113
Operating Range	°C	-15 to +55
	°F	+5 to +131
ELECTRICAL		
Output – mV/V	0.005 to 2 Nm	0.5
	0.04 to 17.7 lbf-in	
	1 to 20 Nm	1.0
	8.85 to 177 lbf-in	
Excitation Voltage – VDC		2 - 12
Bridge Resistance – Ohm		350
Electrical Connection		6-pin binder
MECHANICAL		
Safe Overload – %RO	0.005 to 2 Nm	500
	0.04 to 17.7 lbf-in	
	1 to 20 Nm	200
	8.85 to 177 lbf-in	
Angular Deflection at Rated Torque		< 0.2
IP Rating		IP50
Material		Alloy steel

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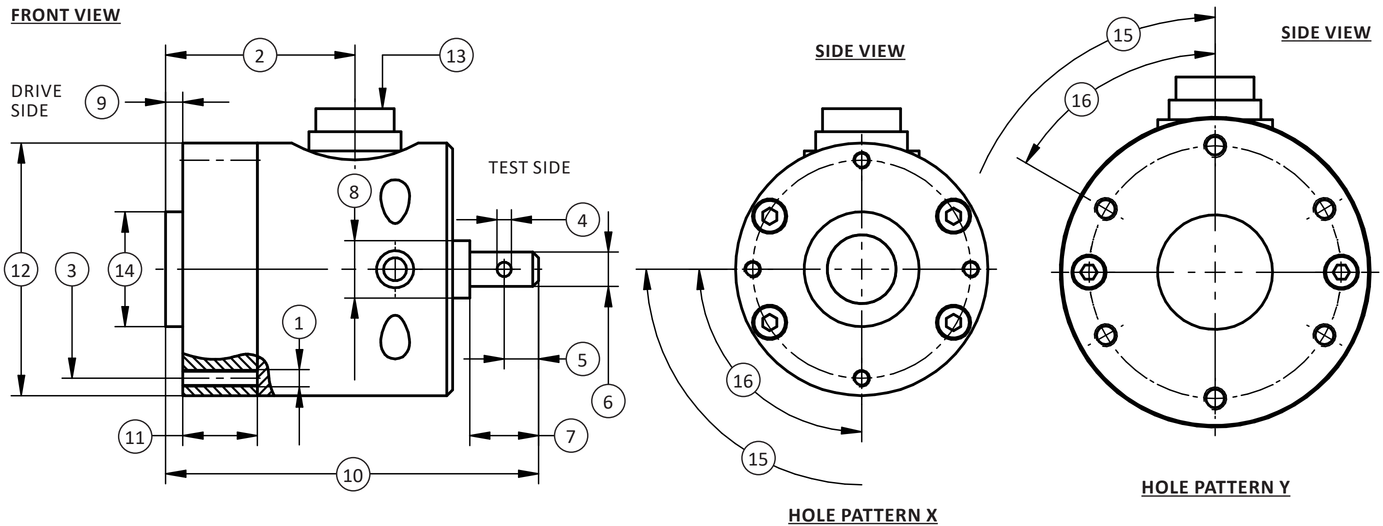
PERFORMANCE PARAMETERS

CAPACITY		Nominal Output ±0.1	SPRING RATE	MASS MOMENT OF INERTIA – (Kg•m²)		MAX THRU.S.T LOAD		MAX SHEAR LOAD	
Nm	lbf-in	mV/V	NM/rad	Drive Side	Test Side	N	lbf	N	lbf
0.005	0.04	0.3	0.5	$6.7x10^{-5}$	$6.2x10^{-7}$	36	8.09	0.6	0.13
0.01	0.09	0.5	0.5	$6.7x10^{-5}$	$6.2x10^{-7}$	36	8.09	0.6	0.13
0.02	0.18	0.5	3.7	$6.7x10^{-5}$	$6.2x10^{-7}$	36	8.09	0.6	0.13
0.05	0.44	0.5	3.7	$6.7x10^{-5}$	$6.2x10^{-7}$	39	8.09	0.6	0.13
0.1	0.89	0.5	18	$6.7x10^{-5}$	$7.6x10^{-7}$	39	8.09	0.7	0.16
0.2	1.77	0.5	18	$6.7x10^{-5}$	$7.6x10^{-7}$	57	12.8	1.2	0.27
0.5	4.43	0.5	182	$6.7x10^{-5}$	$8.0x10^{-7}$	185	41.6	2	0.45
1	8.85	1	182	$6.7x10^{-5}$	$8.0x10^{-7}$	260	58.5	3.2	0.72
2	17.7	1	276	$6.7x10^{-5}$	$8.0x10^{-7}$	400	89.9	6.5	1.46
5	44.3	1	757	$1.4x10^{-4}$	$5.7x10^{-7}$	710	160	16	3.6
10	88.5	1	2379	$1.4x10^{-4}$	$6.1x10^{-7}$	450	101	35	7.87
20	177	1	3913	$1.4x10^{-4}$	$6.6x10^{-7}$	1.05K	236	68	15.3

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

TS22 MINIATURE REACTION TORQUE TRANSDUCER (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITY					
	Hole Pattern X		Hole Pattern X		Hole Pattern Y	
	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)
	0.005, 0.01	0.04, 0.009	0.02, 0.05 0.1, 0.2, 0.5, 1, 2	0.18, 0.44, 0.89, 1.77, 4.43, 8.85, 17.7	5, 10, 20	44.3, 88.5, 177
	mm	in	mm	in	mm	in
(1)	M3		M3		M4	
(2)	33	1.3	33	1.3	31	1.2
(3)	Ø$38^{\pm 0.1}$	$1.5^{\pm 0.004}$	$38^{\pm 0.1}$	$1.5^{\pm 0.004}$	$44^{\pm 0.1}$	$1.7^{\pm 0.004}$
(4)	–		2.5	0.10	4	0.2
(5)	–		6		8	
(6)	Ø3g6	Ø(0.1185/0.1181)	Ø6g6	Ø(0.2367/0.2362)	Ø12g6	Ø(0.4731/0.4724)
(7)	5	0.2	12	0.2	18	0.7
(8)	10	0.4	10	0.4	14	0.6
(9)	3	0.1	3	0.1	3	0.1
(10)	58	2.3	65	2.6	65	2.6
(11)	13	0.5	13	0.5	14	0.6
(12)	44	1.7	44	1.7	54	2.1
(13)	Connector 6-Pin		Connector 6-Pin		Connector 6-Pin	
(14)	Ø20g6	Ø0.7882/0.7874	Ø20g6	Ø0.7882/0.7874	Ø20g6	Ø0.7882/0.7874
(15)	4x90° = (360°)		4x90° = (360°)		6x60° = (360°)	
(16)	90°		90°		60°	

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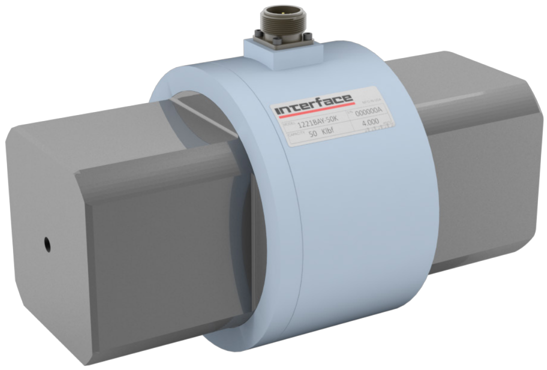
FORCE MEASUREMENT SOLUTIONS.

TSQ HIGH CAPACITY SQUARE DRIVE TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- 300K to 3,000K lbf-in capacities (34K to 340K Nm)
- Male square on each end
- High stiffness
- 2X save overload
- Fully calibrated, CW & CCW

STANDARD CONFIGURATION



Model TSQ (Shown)

Specifications

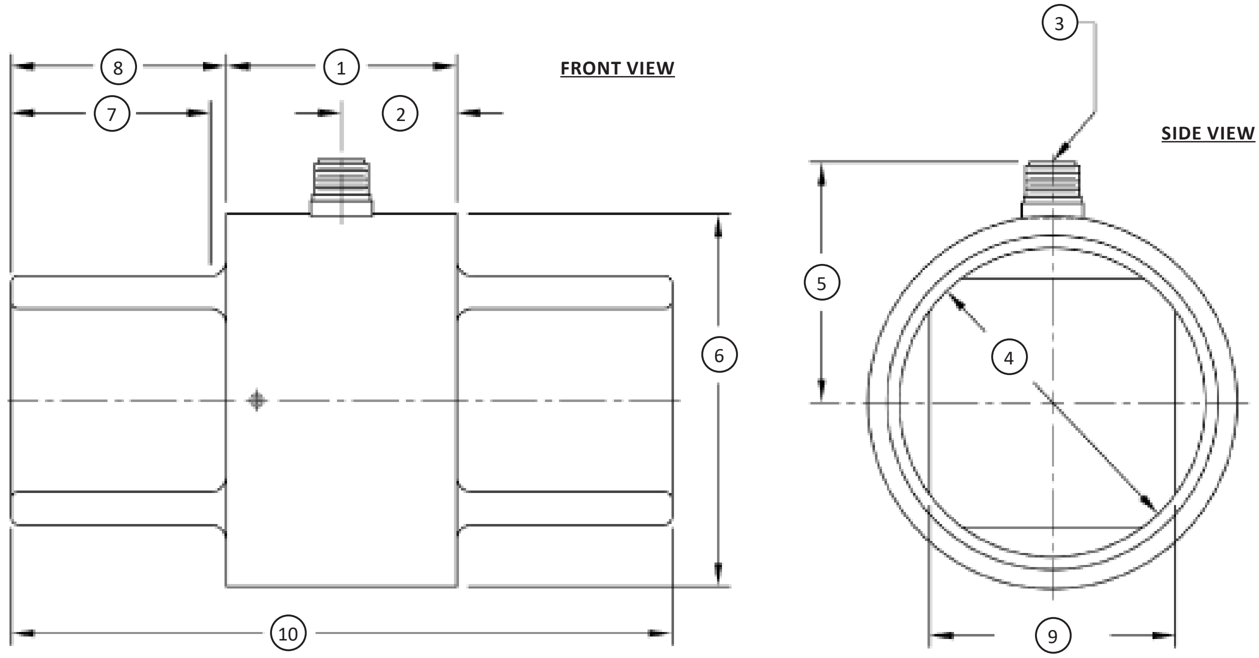
ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.25 (TSQ1-1200K ±0.50)
Hysteresis – %FS		±0.25 (TSQ1-1200K ±0.50)
Nonrepeatability – %RO		±0.05
TEMPERATURE		
Effect on zero – %RO / °F		±0.0002
Effect on output – % / °F		±0.0002
Compensated range	°F	+75 to +175
	°C	+24 to +175
Operating range	°F	-65 to +225
	°C	-54 to +107
ELECTRICAL		
Rated output – mV/V (Nominal)		3
Input resistance – Ohms		350
Output resistance – Ohms		350
Excitation, nominal – VDC		10
Excitation, MAX – VDC		15
MECHANICAL		
Safe overload – %RO		200
Connector		CF 3102E-14S-6P
Calibration		CW & CCW to rated capacity
Material		Alloy steel

PERFORMANCE PARAMETERS

MODEL	CAPACITY		TORQUE OVERLOAD		TORSIONAL STIFFNESS		WEIGHT		MAX THRU.S.T LOAD		MAX BENDING MOMENT	
	lbf-in	Nm	lbf-in	Nm	lbf-in/rad	Nm/rad	lbs	kg	lbf	N	lbf-in	Nm
TSQ1	300K	33.9K	600K	67.8K	52,200K	5,898K	57	25.9	400K	1779K	400K	45.2K
	600K	67.8K	1,200K	136K	56,600K	6,395K	57	25.9	400K	1779K	400K	45.2K
	1200K	136K	2,400K	271K	57,200K	6,460K	57	25.9	400K	1779K	400K	45.2K
TSQ2	750K	84.8K	1,500K	170K	171,000K	19,320K	166	75.3	1,500K	6672K	1,500K	169K
	1500K	170K	3,000K	339K	207,000K	23,390K	166	75.3	1,500K	6672K	1,500K	169K
	3000K	339K	6,000K	678K	220,000K	24,856K	166	75.3	1,500K	6672K	1,500K	169K

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

TSQ HIGH CAPACITY SQUARE DRIVE TORQUE TRANSDUCER (U.S. & METRIC)



Dimensions

See Drawings	MODEL			
	TSQ1		TSQ2	
	in	mm	in	mm
(1)	10.75	273.1	16	406
(2)	1.875	47.63	2.5	34
(3)	CF 3102E 14S-6P Connector Mating Connector Supplied (MS 3106A 14S-6S)			
(4)	Ø4.969	Ø126.21	Ø7.5	Ø191
(5)	3.875	98.43	5.125	130.18
(6)	Ø6	Ø152	Ø8.5	Ø216
(7)	3.25	82.6	5	127
(8)	3.5	89	5.5	140
(9)	4 TYP ACROSS FLATS	102 TYP ACROSS FLATS	5.5 TYP ACROSS FLATS	140 TYP ACROSS FLATS
(10)	10.75	273.1	16	406

Catalog 2019 06-15-2020

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

FORCE MEASUREMENT SOLUTIONS

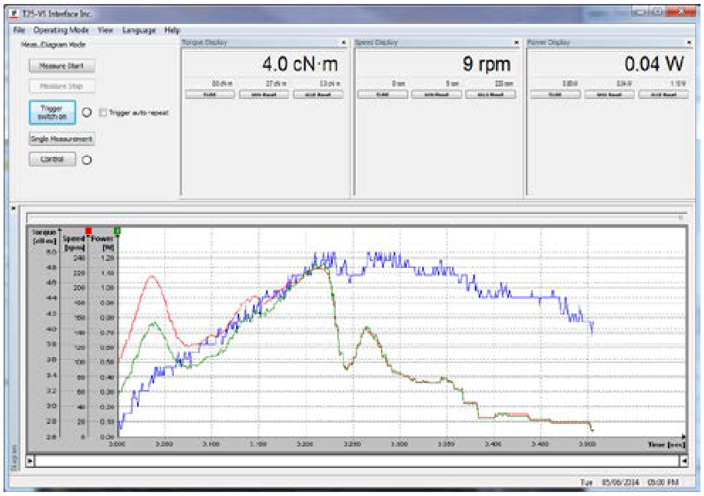
U.S.B OUTPUT OPTION AVAILABLE ON T12, T15, T25 ROTARY TORQUE TRANSDUCER (U.S. & METRIC)

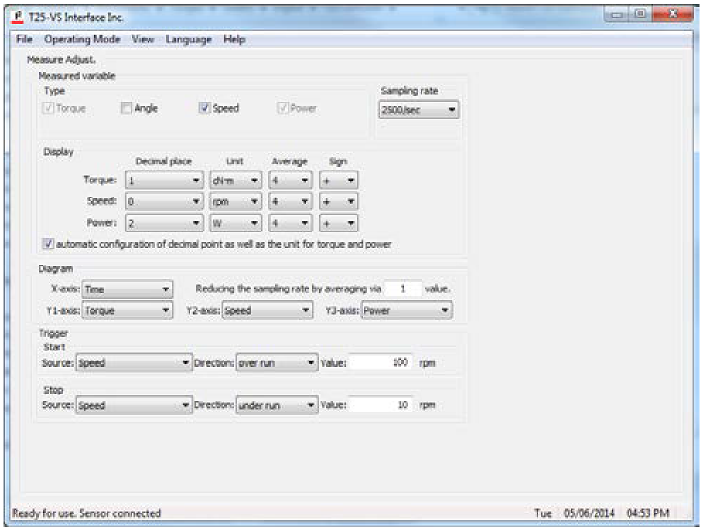
FEATURES & BENEFITS

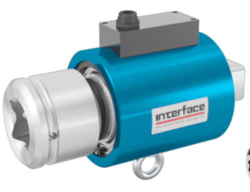
- Torque, speed & power OR torque = angle
- Display, graph & log
- Up to 2500 measurments/second
- 16-bit resolution
- Peak & valley
- Unit conversion
- Triggered start & stop for automatic event capture
- Automatic scaling of Y-Axis
- Log files are in Excel compatible .csv format
- Supply over U.S.B – no separate power cord
- Configuration & calibration stored in sensor
- Includes software & U.S.B cable

Specifications

U.S.B SPECIFICATIONS	
Output Signal – torque	±25,000
Output Signal – speed/angle	±32,511
Speed Resolution – rpm	1
Angle Resolution – degree	0.25
Speed Accuracy – %FS	±1
ELECTRICAL	
Sampel rate – samples/sec	2500
Supply Voltage – VDC	4 - 6 from U.S.B
Supply Current – mA	≤ 250
Calibration Signal – %FS	100 (software activated)







T12 SQUARE DRIVE* | T15 HEX DRIVE* | T25*

For more information, see datasheet for this product.

Notes:

Multi-Axis Sensors

2-Axis

3-Axis

6-Axis

Axial Torsion

3A SERIES 3-AXIS LOAD CELLS (U.S. & METRIC)

FEATURES & BENEFITS

- 3-Axis – Fx Fy Fz; independent bridges
- 20N to 500kN (4.5 to 112K lbf) force range
- Compact size
- Low crosstalk
- Temperature compensated

Interface's 3-axis load cell measures forces simultaneoU.S.ly in 3 mutually perpendicular axes: X, Y, and Z - tension and compression. Each axis provides a unique mV/V output and requires no mathematical manipulation. The 3-axis
load cell is built to minimize eccentric loading effects and crosstalk between axes.

The 3A Series 3-axis load cell is ideally suited to many indU.S.trial and scientific applications, such as aerospace, robotics, automotive and medical research (orthopedics and biomechanical).

The load cell is provided in varioU.S. capacity ranges and sizes with each of the three axes providing the
same capacity.

We are happy to work with your design needs – providing a cU.S.tom design if warranted for varying capacities (between X, Y, and Z), higher Temperature capability, or

WIRING DIAGRAM

	Description	Wire Color	37-pin D-SUB	16-pin M23
Shield	Shield	Shield	1	N/C
X-Axis	+ Excitation	Brown	20	2
	- Excitation	White	27	1
	+ Output	Green	22	3
	- Output	Yellow	25	4
Y-Axis	+ Excitation	Pink	2	6
	- Excitation	Gray	9	5
	+ Output	Blue	4	7
	- Output	Red	7	8
Z-Axis	+ Excitation	Purple	11	10
	- Excitation	Black	18	9
3A60A	+ Output	Orange	13	11
	- Output	Transparent	16	12
3A120, 3A160, 3A300, & 3A400	+ Output	Gray/Pink	13	11
	- Output	Red/Blue	16	12

STANDARD CONFIGURATION

Model 3A120 (Shown)

ACCESSORIES

Model BSC4D (Shown)
4-Channel Analog Amplifier

Model BSC4A (Shown)
4-Channel U.S.B Digital Amplifier

* U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

3A60A SERIES 3-AXIS LOAD CELL (U.S. & METRIC)

SPECIFICATIONS

ACCURACY – (MAX ERROR*)							
Nonlinearity – %FS		±0.2					
Hysteresis – %FS		±0.02					
Creep, in 30 min – %		±0.1					
TEMPERATURE							
Effect on Zero – %RO / °C		±0.02					
Effect on Output – % / °C		±0.02					
Compensated Range	**°C**	-10 to +70					
	°F	+14 to +158					
Operating Range	**°C**	-10 to +85					
	°F	+14 to +185					
ELECTRICAL							
Rated Output (Nominal) – mV/V		±0.5					
Max. Excitation Voltage – V		10					
Zero Balance – mV/V		0.1					
Input Resistance, x/y axis – Ω		395 ±5			375 ±5		
Output Resistance, z axis – Ω		355 ±5					
Insulation Resistance – Ω		> 5 × 10^9					
Electrical Connection – m		5 Cable with 37-PIN Connector. Includes Mate					
MECHANICAL							
Rated Capacity (FS)	**N**	10	20	50	100	200	500
	lbf	2.25	4.5	11.2	22.5	45	112
Material		Aluminum					Stainless Steel
Deflection – Fx, Fy	**mm**	0.10					0.20
	in	0.004					0.008
Deflection – Fz	**mm**	0.15					
	in	0.006					
Total Weight	**kg**	0.110					0.2
	lbs	0.2425					0.44
Safe Overload – %RO		150					
Ultimate Overload – %RO		300					
Protection Level		IP54					
ECCENTRICITY AND MOMENT*							
Allowable Moment	**Nm**	20					50
	lbf-in	177					443
Crosstalk: x:y / y:x – %		±2					
Crosstalk: z:x/y – %		±2					
Crosstalk: x/y:z – %		±2					

STANDARD CONFIGURATION

Model 3A60A (Shown)

FEATURES & BENEFITS

The 3A60A is a new and improved version of the original 3A60 with revised mounting holes and extended capacity ranges. The 3A60A is NOT backward compatible with the old 3A60.

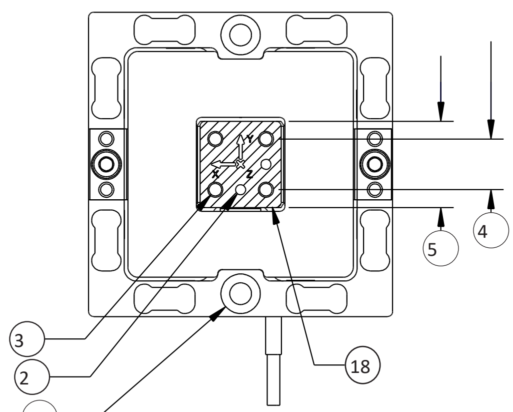
***Nominal**

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

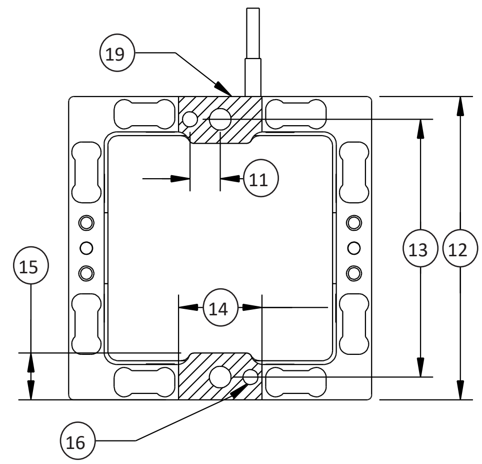
FORCE MEASUREMENT SOLUTIONS.

3A60A SERIES 3-AXIS LOAD CELL (U.S. & METRIC)

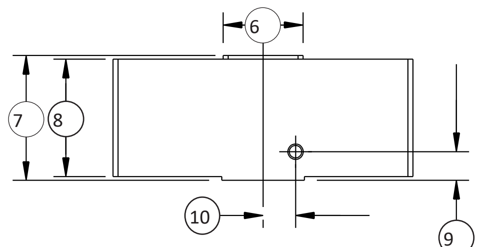
DIMENSIONS



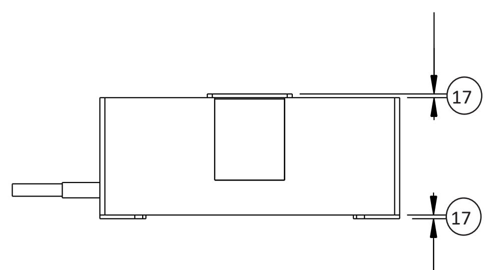
TOP VIEW



BOTTOM VIEW



FRONT VIEW



SIDE VIEW

See Drawing	Metric	U.S.
	mm	in
(1)	2 x Ø4.3 ↧ 24.25, ⌴ Ø7.8 ↧ 17.25	2 x Ø0.17 ↧ 0.955, ⌴ Ø0.31 ↧ 0.679
(2)	2 x Ø2 E7 ↧ 5, ⌵ 118°	2x Ø(0.0797/0.0793) ↧ 0.2, ⌵ 118°
(3)	4 x (M3X0.5) ↧ 10, ⌵ 118°	4 x (M3X0.5) ↧ 0.4, ⌵ 118°
(4)	10	0.4
(5)	17	0.7
(6)	16	0.6
(7)	25	1.0
(8)	23.5	0.9
(9)	5.75	0.226
(10)	6.5	0.3
(11)	6	0.2
(12)	60	2.4
(13)	51	2.0
(14)	16.5	0.6
(15)	9.25	0.4
(16)	2 x Ø3 E7 ↧ 5, ⌵ 118°	2x Ø(0.1191/0.1187) ↧ 0.2, ⌵ 118°
(17)	0.75	0.030
(18)	Bolting Surface / Measuring Platform	
(19)	Bolting Surface	

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

FORCE MEASUREMENT SOLUTIONS

3A120 SERIES 3-AXIS LOAD CELL (U.S. & METRIC)

SPECIFICATIONS

ACCURACY – (MAX ERROR*)									
Nonlinearity – %FS		±0.2							
Hysteresis – %FS		±0.02							
Creep, in 30 min – %		±0.1							
TEMPERATURE									
Effect on Zero – %RO / °C		±0.02							
Effect on Output – % / °C		±0.02							
Compensated Range	**°C**	-10 to +70							
	°F	+14 to +158							
Operating Range	**°C**	-10 to +85							
	°F	+14 to +185							
ELECTRICAL									
Rated Output (Nominal) – mV/V		±0.5	±1						
Max. Excitation – V		10							
Zero Balance – mV/V		0.1							
Input Resistance, x/y axis – Ω		780 ±5					740 ±5		
Output Resistance, z axis – Ω		700 ±5							
Insulation Resistance – Ω		> 5 × 10^9							
Electrical Connection – m		5 Cable with 37-PIN Connector. Includes Mate							
MECHANICAL									
Rated Capacity (FS)	**N**	50	100	200	500	1K	1K **	2K	5K
	lbf	11.2	22.5	45	112	225	225	450	1.12K
Material		Aluminum					Stainless steel		
Deflection – Fx, Fy	**mm**	0.06					0.08		
	in	0.002					0.003		
Deflection – Fz	**mm**	0.12					0.16		
	in	0.005					0.006		
Total Weight	**kg**	1.1					2.0		
	lbs	2.43					4.41		
Safe Overload – %RO		150							
Ultimate Overload – %RO		300							
Protection Level		IP54 (option IP68)							
ECCENTRICITY AND MOMENT*									
Allowable Moment	**Nm**	100					200	250	300
	lbf-in	885					1.77K	2.21K	2.66K
Crosstalk: x:y / y:x – %		±1							
Crosstalk: z:x/y – %		±2							
Crosstalk: x/y:z – %		±1							
Influence of Eccentric Load to FS – %FS / 100Nm		±1							

STANDARD CONFIGURATION

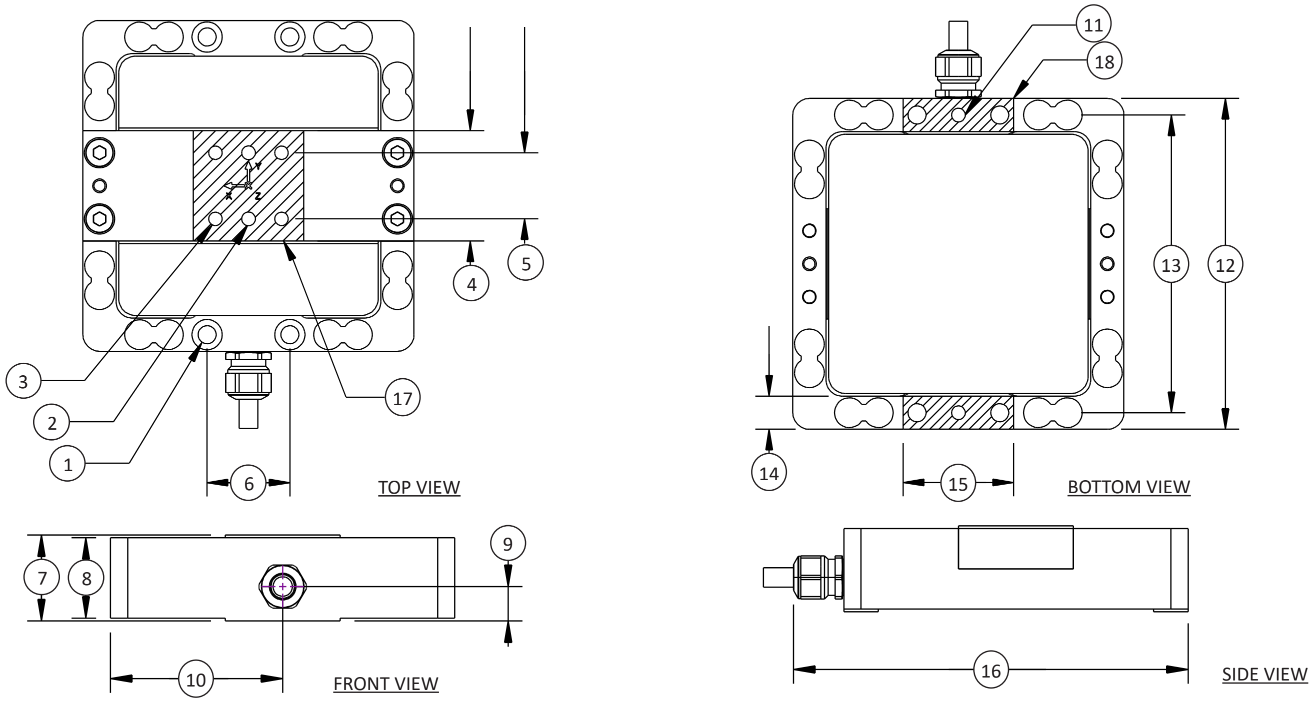
Model 3A120 (Shown)

** Nominal*
***** Stainless Version denoted by 3A120S-1KN***
U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

interface
FORCE MEASUREMENT SOLUTIONS.

3A120 SERIES 3-AXIS LOAD CELL (U.S. & METRIC)

DIMENSIONS



See Drawing	Metric	U.S.
	mm	in
(1)	4 x Ø6.6 ↧ 29 ⌵ 118°, ⌴ Ø11.0 ↧ 22.5	4 x Ø0.26 ↧ 1.1 ⌵ 118°, ⌴ Ø0.43 ↧ 0.89
(2)	2 x Ø5 E7 ↧ 12, ⌵ 118°	2 x Ø(0.1981/0.1976) ↧ 0.5, ⌵ 118°
(3)	4 x (M6x1) ↧ 12	4 x (M6x1) ↧ 0.5
(4)	40	1.6
(5)	24	0.9
(6)	30	1.2
(7)	30	1.2
(8)	28	1.1
(9)	12	0.5
(10)	60	2.4
(11)	2 x Ø5 E7 ↧ 3	2 x Ø(0.1981/0.1976) ↧ 0.1
(12)	120	4.7
(13)	108	4.3
(14)	12	0.5
(15)	40	1.6
(16)	137.5	5.4
(17)	Bolting Surface / Measuring Platform	
(18)	Bolting Surface	

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

interface
FORCE MEASUREMENT SOLUTIONS

3A160 SERIES 3-AXIS LOAD CELL (U.S. & METRIC)

SPECIFICATIONS

ACCURACY – (MAX ERROR*)				
Nonlinearity – %FS		±0.2		
Hysteresis – %FS		±0.1		
Creep, in 30 min – %		±0.05		
TEMPERATURE				
Effect on Zero – %RO / °C		±0.02		
Effect on Output – % / °C		±0.02		
Compensated Range	**°C**	-10 to +70		
	°F	+14 to +158		
Operating Range	**°C**	-10 to +85		
	°F	+14 to +158		
ELECTRICAL				
Rated Output (Nominal) – mV/V		±1		
Max. Excitation Voltage – V		10		
Zero Balance – mV/V		0.1		
Input Resistance, x/y axis – Ω		740 ±5		
Output Resistance, z axis – Ω		700 ±5		
Insulation Resistance – Ω		> 5 × 10^9		
Electrical Connection – m		5 Cable with 37-PIN Connector. Includes Mate		
MECHANICAL				
Rated Capacity (FS)	**N**	2K - 10K	20K	50K
	lbf	450 - 2.25K	4.5K	11.2K
Material		Nickel plated steel		
Deflection – Fx, Fy – mm	**mm**	0.08		
	in	0.003		
Deflection – Fz – mm	**mm**	0.16		
	in	0.006		
Total Weight – kg	**kg**	8.2		
	lbs	18.08		
Safe Overload – %RO		150		
Ultimate Overload – %RO		300		
Protection Level		IP54		
ECCENTRICITY AND MOMENT*				
Allowable Moment	**Nm**	1K	2K	
	lbf-in	8.85K	17.7K	
Crosstalk: x:y / y:x – %		±1		
Crosstalk: z:x/y – %		±2		
Crosstalk: x/y:z – %		±2		

STANDARD CONFIGURATION

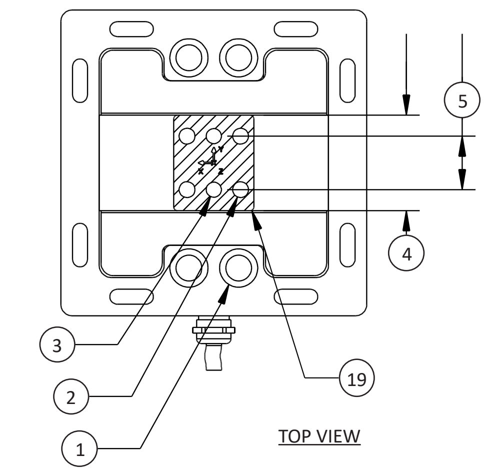
Model 3A160 (Shown)

**** Nominal***

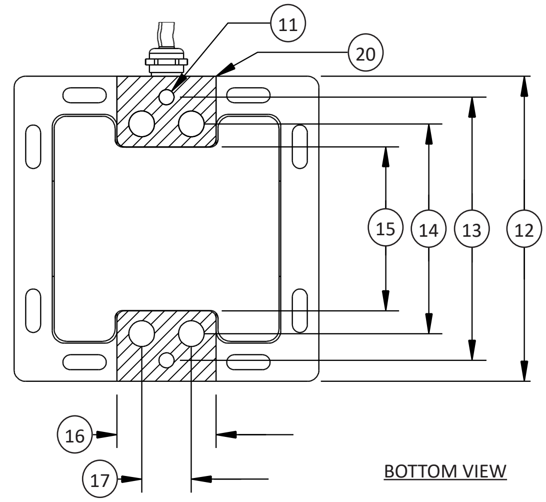
U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

3A160 SERIES 3-AXIS LOAD CELL (U.S. & METRIC)

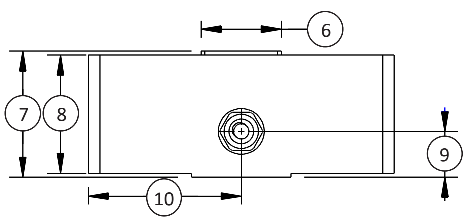
DIMENSIONS



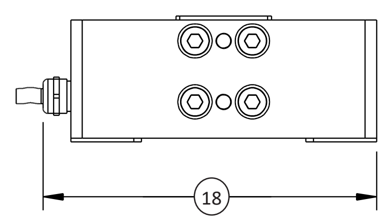
TOP VIEW



BOTTOM VIEW



FRONT VIEW



SIDE VIEW

See Drawing	Metric	U.S.
	mm	in
(1)	4 x Ø14 THRU, ⌴ Ø20 ↧ 13	4 x Ø0.6 THRU, ⌴ Ø0.8 ↧ 0.5
(2)	4 x (M10x1.5) ↧ 15, ⌵ 118°	4 x (M10x1.5) ↧ 0.6, ⌵ 118°
(3)	2 x Ø8 H7 ↧ 15, ⌵ 118°	2 x Ø(0.3156/0.3150) ↧ 0.6, ⌵ 118°
(4)	50	2.0
(5)	28	1.1
(6)	42	1.7
(7)	66	2.6
(8)	62	2.4
(9)	24	0.9
(10)	80	3.1
(11)	2 x Ø8 H7 ↧ 5, ⌵ 118°	2 x Ø(0.3156/0.3150) ↧ 0.2, ⌵ 118°
(12)	160	6.3
(13)	138	5.4
(14)	110	4.3
(15)	86	3.4
(16)	52	2.0
(17)	26	1.0
(18)	174.5 (+1)	6.9 (+0.04)
(19)	Bolting Surface / Measuring Platform	
(20)	Bolting Surface	

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

3A300 SERIES 3-AXIS LOAD CELL (U.S. & METRIC)

SPECIFICATIONS

ACCURACY – (MAX ERROR*)				
Nonlinearity – %FS		±0.2		
Hysteresis – %FS		±0.1		
Creep, in 30 min – %		±0.5		
TEMPERATURE				
Effect on Zero – %RO / °C		±0.02		
Effect on Output – % / °C		±0.02		
Compensated Range	**°C**	-10 to +70		
	°F	+14 to +158		
Operating Range	**°C**	-10 to +85		
	°F	+14 to +185		
ELECTRICAL				
Rated Output (Nominal) – mV/V		±1		
Max. Excitation Voltage – V		10		
Zero Balance – mV/V		0.1		
Input Resistance, z axis – Ω		740 ±5		
Output Resistance, z axis – Ω		700 ±5		
Input Resistance, x/y axis – Ω		370 ±5		
Output Resistance, x/y axis – Ω		350 ±5		
Insulation Resistance – Ω		> 5×10^9		
Electrical Connection – m		16-PIN Connector. Includes 5 mating cable with 37-PIN connector		
MECHANICAL				
Rated Capacity (FS)	**N**	50K	100K	200K
	lbf	11.2K	22.5K	45K
Material		Nickel plated steel		
Deflection – Fx, Fy	**mm**	±0.2		
	in	±0.008		
Deflection – Fz	**mm**	±0.4		
	in	±0.016		
Total Weight	**kg**	45		
	lbs	99.2		
Safe Overload – %RO		150		
Ultimate Overload – %RO		300		
Protection Level		IP54		
ECCENTRICITY AND MOMENT*				
Allowable Moment	**Nm**	4K	8K	12K
	lbf-in	35.4K	70.8K	106K
Crosstalk: x:y / y:x – %		±1		
Crosstalk: z:x/y – %		±1		

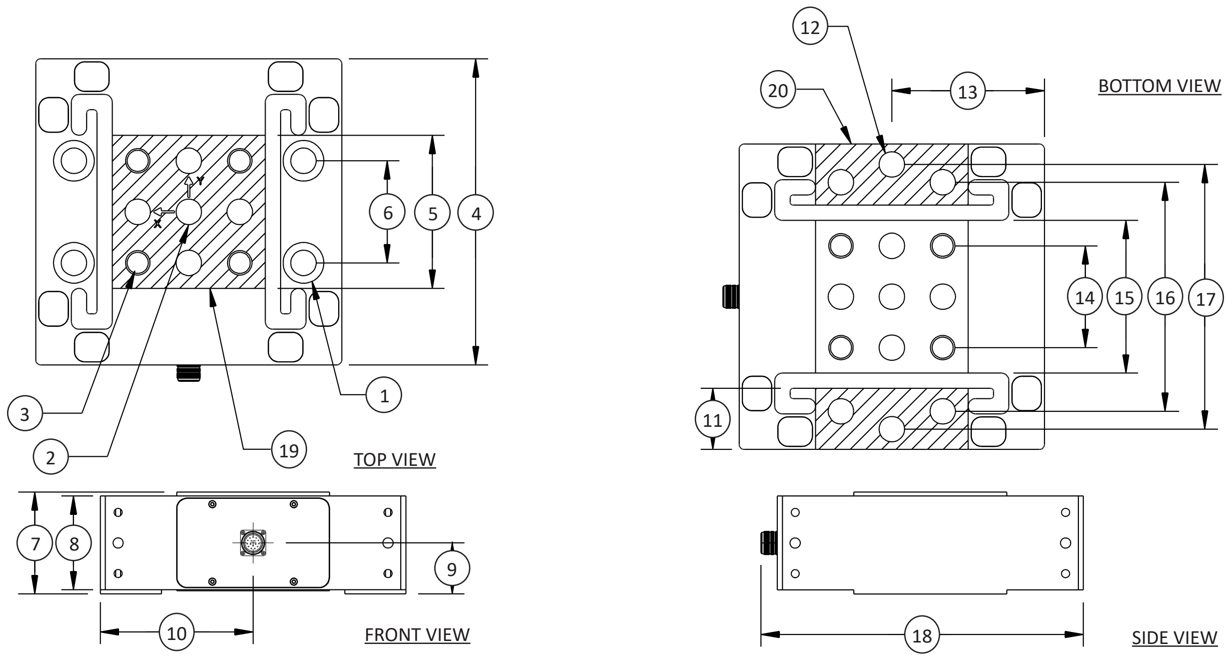
**** Nominal***

STANDARD CONFIGURATION

Model 3A300 (Shown)

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

3A300 SERIES 3-AXIS LOAD CELL (U.S. & METRIC)



DIMENSIONS

See Drawing	Metric	U.S.
	mm	in
(1)	4 x Ø25 THRU, ⌴ Ø40 ↧ 30	4 x Ø1.0 THRU, ⌴ Ø1.6 ↧ 1.2
(2)	5 x Ø25 H7 THRU	5 x Ø(0.9851/0.9842) THRU
(3)	4 x (M24x3) THRU	
(4)	300	11.8
(5)	150	5.9
(6)	100	3.9
(7)	100	3.9
(8)	92	3.6
(9)	50	2.0
(10)	150	5.9
(11)	60	2.4
(12)	2 x Ø25 H7 ↧ 40	2 x Ø(0.9851/0.9842) ↧ 1.6
(13)	150	5.9
(14)	100	3.9
(15)	150	5.9
(16)	225	8.9
(17)	260	10.2
(18)	316	12.4
(19)	Bolting Surface / Measuring Platform	
(20)	Bolting Surface	

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U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

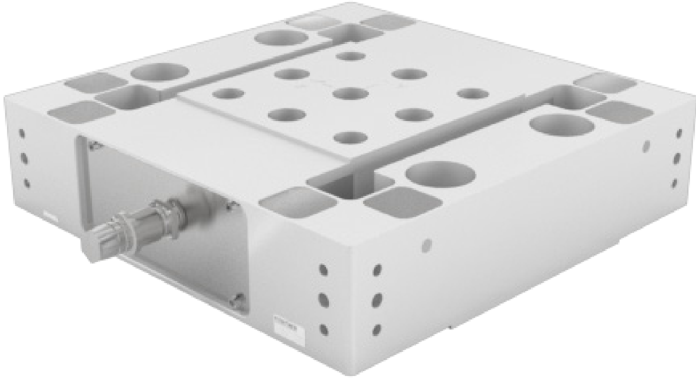
3A400 SERIES 3-AXIS LOAD CELL (U.S. & METRIC)

SPECIFICATIONS

ACCURACY – (MAX ERROR*)		
Nonlinearity – %FS		±0.2
Hysteresis – %FS		±0.1
Creep, in 30 min – %		±0.05
TEMPERATURE		
Effect on Zero – %RO / °C		±0.02
Effect on Output – % / °C		±0.02
Compensated Range	**°C**	-10 to +70
	°F	+14 to +158
Operating Range	**°C**	-10 to +85
	°F	+14 to +185
ELECTRICAL		
Rated Output (Nominal) – mV/V		±1
Max. Excitation Voltage – V		10
Zero Balance – mV/V		0.1
Output Resistance, z axis – Ω		340 ±5
Input Resistance, x/y axis – Ω		370 ±5
Insulation Resistance – Ω		> 5 × 10^9
Electrical Connection – m		16-PIN Connector. Includes 5 mating cable with 37-PIN connector
MECHANICAL		
Rated Capacity (FS)	**N**	500K
	lbf	112K
Material		Nickel plated steel
Deflection – Fx, Fy	**mm**	0.3
	in	0.01
Deflection – Fz	**mm**	0.6
	in	0.02
Total Weight	**kg**	120
	lbs	4.7
Safe Overload – %RO		150
Ultimate Overload – %RO		300
Protection Level		IP54
ECCENTRICITY AND MOMENT*		
Allowable Moment	**Nm**	15K
	lbf-in	133K
Crosstalk: x:y / y:x – %		±1
Crosstalk: z:x/y – %		±1

**** Nominal***

STANDARD CONFIGURATION

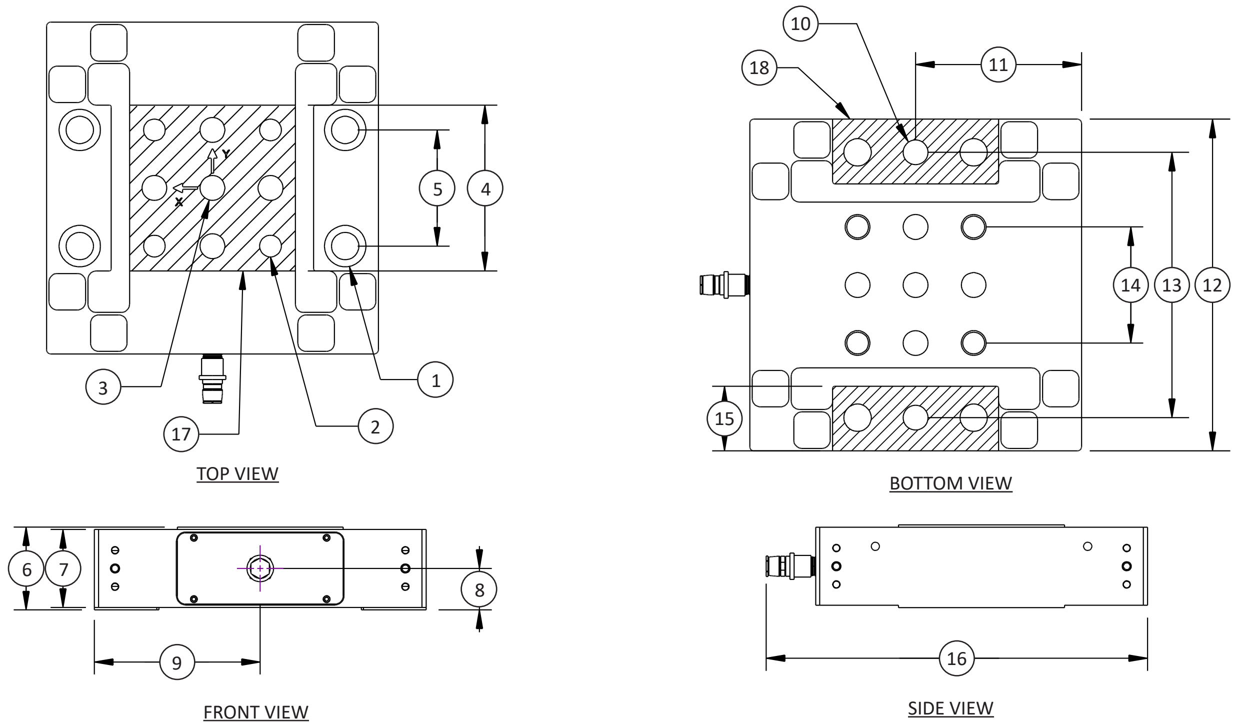


Model 3A400 (Shown)

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

3A400 SERIES 3-AXIS LOAD CELL (U.S. & METRIC)

DIMENSIONS



See Drawing	Metric	U.S.
	mm	in
(1)	4 x Ø33 THRU, ⌴ Ø50 ↧ 36	4 x Ø1.3 THRU, ⌴ Ø2.0 ↧ 1.4
(2)	4 x (M30x3.5) THRU	4 x (M30x3.5) THRU
(3)	5 x Ø30 E7 THRU	5 x Ø(1.1835/1.1827) THRU
(4)	200	7.9
(5)	140	5.5
(6)	100	3.9
(7)	94	3.7
(8)	50	2.0
(9)	200	7.9
(10)	2 x Ø30 E7 ↧ 40	2 x Ø(1.1835/1.1827) ↧ 1.6
(11)	200	7.9
(12)	400	15.7
(13)	320	12.6
(14)	140	5.5
(15)	78	3.1
(16)	460 (+5)	18.1 (+0.2)
(17)	Bolting Surface / Measuring Platform	
(18)	Bolting Surface	

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

6A SERIES 6-AXIS LOAD CELLS (Fx Fy Fz Mx My Mz) (U.S. & METRIC)

FEATURES & BENEFITS

- 6-Axis – force and torque in all six axes
- Capacities: Force N(lbf) / Torque Nm(lbf-in) – 50(11.2)/1(8.85) to 500K(112K)/20K(177K)
- Compact size
- Force and moment values MU.S.T be calculated U.S.ing supplied 36-term coefficient matrix
- Low crosstalk
- Temperature compensated
- Optional BX8 amplifier and software can be U.S.ed for force and moment value calculation

Interface's 6-axis load cell measures forces simultaneoU.S.ly in three mutually perpendicular axes and three simultaneoU.S. torques about those same axes. Six full bridges provide mV/V output on six independent channels.

Interface's 6-axis load cell is ideally suited to many indU.S.trial and scientific applications, such as aerospace, robotics, automotive and medical research (orthopedics and biomechanical).

A 36-term coefficient matrix is included for calculating the load and torque values in each axis.

An 8-channel amplifier with U.S.B PC interface is also available which simplifies data analysis.

STANDARD CONFIGURATION

Model 6A154 (Shown)

Specifications

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		± 0.1
Hysteresis – %FS		± 0.1
Nonrepeatability – %RO		± 0.5
Creep, in 20 min – %		± 0.1
TEMPERATURE		
Effect on Zero – %RO / °C MAX		± 0.01
Effect on Output – % / °C MAX		± 0.05
Compensated Range	°C	-10 to +70*
	°F	+14 to +158*
Operating Range	°C	-10 to +85
	°F	+14 to +185
ELECTRICAL		
Rated Output – mV/V (Nominal)		±0.4
Excitation Voltage – V MAX		5
Crosstalk – %		±1
Zero Balance – mV/V		< 2
Input Resistance (6A27) – Ω		1K ±10
Output Resistance (6A27) – Ω		1K ±10
Input Resistance – Ω		350 ±10
Output Resistance – Ω		350 ±10
MECHANICAL		
Safe Overload – %CAP		150
Ultimate Overload – %RO		300
Cable Length	m	5
	ft	16.4

Temperature compensation not available on Models 6A27 and 6A40

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

6A SERIES 6-AXIS LOAD CELLS (Fx Fy Fz Mx My Mz) (U.S. & METRIC)

CHARACTERISTICS

See Drawing	MODEL										
	6A27	6A40		6A68					6A80		
	A	A	B	A	B	C	D	E	A	B	C
Fx (N)	50	200	500	1K	2K	5K	10K	10K	1K	2K	5K
Fy (N)	50	200	500	1K	2K	5K	10K	10K	1K	2K	5K
Fz (N)	200	500	2K	2K	4K	10K	20K	20K	2.5K	5K	15K
Mx (Nm)	1	5	20	20	50	50	100	500	50	100	250
My (Nm)	1	5	20	20	50	50	100	500	50	100	250
Mz (Nm)	1	10	40	20	50	50	100	500	50	100	250
Diameter (mm)	27	60		83					80		
Height (mm)	25	40		64					50		
Weight (g)	25	250	400	830		1050			450		1000
Material	SS	AL	SS	AL		SS			AL		SS
Deflection (mm)	0.01	0.1	0.03	0.04					0.02		
Deflection (rad)	0.01	0.01	0.003	0.001					0.001		
Protection (IP)	65	65		65					65		

See Drawing	MODEL												
	6A110		6A130		6A154				6A175		6A225		
	A	B	A	B	A	B	C	D	A	B	A	B	C
Fx (N)	4K	10K	5K	15K	50	100	200	500	10K	20K	50K	100K	200K
Fy (N)	4K	10K	5K	15K	50	100	200	500	10K	20K	50K	100K	200K
Fz (N)	10K	25K	15K	50K	100	200	500	1K	20K	50K	100K	250K	500K
Mx (Nm)	250	750	500	1.2K	5	10	20	50	1K	2K	10K	15K	20K
My (Nm)	250	750	500	1.2K	5	10	20	50	1K	2K	10K	15K	20K
Mz (Nm)	250	750	500	1.2K	5	10	20	50	1K	2K	10K	15K	20K
Diameter (mm)	110		130		154				175		225		
Height (mm)	60		80		120				116		140		
Weight (g)	880	1800	1500	3200	800				11,000		24000		
Material	AL	SS	AL	SS	AL				SS		SS		
Deflection (mm)	0.03		0.05		0.08			0.1	0.1		0.1		
Deflection (rad)	0.001		0.002		0.001				0.01		0.01		
Protection (IP)	65		65		65				65		65		

Note:
Higher capacities available upon request

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interface

FORCE MEASUREMENT SOLUTIONS.

6A27 6-AXIS LOAD CELL (U.S. & METRIC)

STANDARD CONFIGURATION

Model 6A27 (Shown)

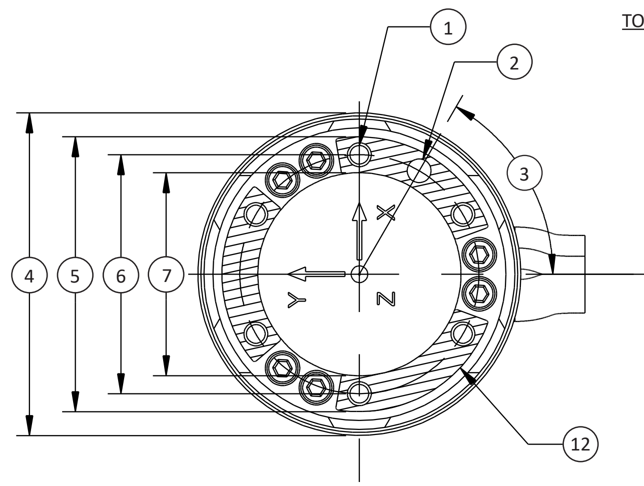
APPLICATIONS

- Integration into wind tunnel models
- Integration into handles of medical tools
- Sports medicine
- Biomechanics
- Control of assembly and handling processes in micromechanics

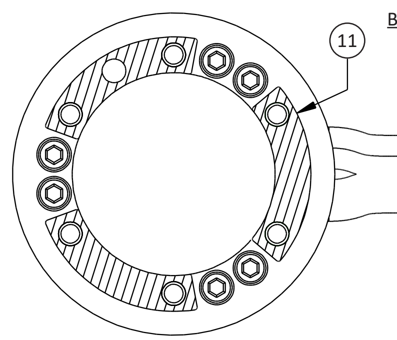
CONNECTOR OPTIONS

- 24-Pin M16
- 44-Pin High Density D-Sub

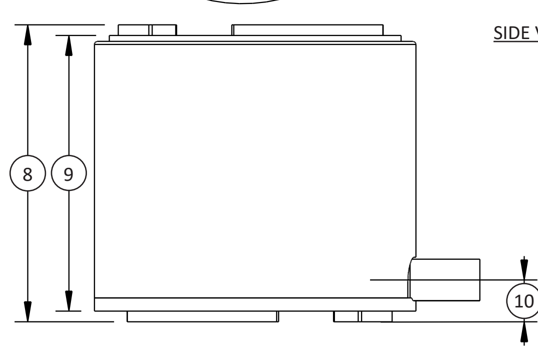
TOP VIEW



BOTTOM VIEW



SIDE VIEW



DIMENSIONS

See Drawing	Metric	U.S.
	mm	in
(1)	6 x (M2x0.4) ↧ 4 ⌵ 118°	6 x (M2x0.4) ↧ 0.2 ⌵ 118°
(2)	Ø2 E7 ↧ 4	Ø(0.0797/0.0793) ↧ 0.2
(3)	60°	
(4)	Ø27	Ø1.1
(5)	Ø23 (+0.000/-0.025)	Ø0.9 (+0.0000/-0.0010)
(6)	Ø 20	Ø 0.8
(7)	Ø17 (+0.10/+0.05)	Ø0.7 (+0.004/+0.002)
(8)	25	1.0
(9)	23	0.9
(10)	3.5	0.14
(11)	Bolting Surface / Measuring Platform	
(12)	Bolting Surface	

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6A40 6-AXIS LOAD CELL (U.S. & METRIC)

STANDARD CONFIGURATION

Model 6A40 (Shown)

APPLICATIONS

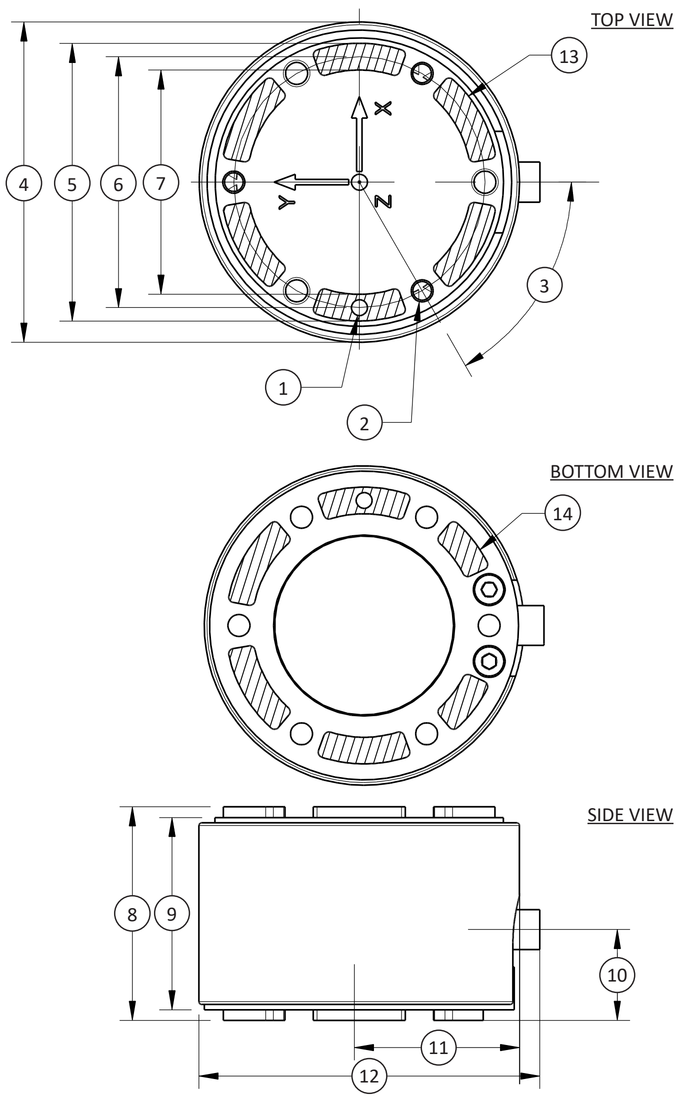
- Collision detection
- “Teach-In”
- Presence or error detection
- Medical / prosthetics / orthopedics
- Gait analysis
- Sports medicine
- Comfort / ergonomics

CONNECTOR OPTIONS

- 24-Pin M16
- 44-Pin High Density D-Sub

DIMENSIONS

See Drawing	Metric	U.S.
	mm	in
(1)	Ø3 E7 ↧ 7	Ø(0.1192/0.1187) ↧ 0.3
(2)	6 x (M5x0.8) ↧ 6	6 x (M5x0.8) ↧ 0.2
(3)	60°	
(4)	Ø60	Ø2.4
(5)	Ø52 (+0.000/-0.050)	Ø2.0 (+0.0000/-0.0020)
(6)	Ø47	Ø1.9
(7)	Ø42	Ø1.7
(8)	40	1.6
(9)	36	1.4
(10)	17	0.7
(11)	30	1.2
(12)	64	2.5
(13)	Bolting Surface / Measuring Platform	
(14)	Bolting Surface	



U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

6A68 6-AXIS LOAD CELL (U.S. & METRIC)

STANDARD CONFIGURATION

Model 6A68 (Shown)

APPLICATIONS

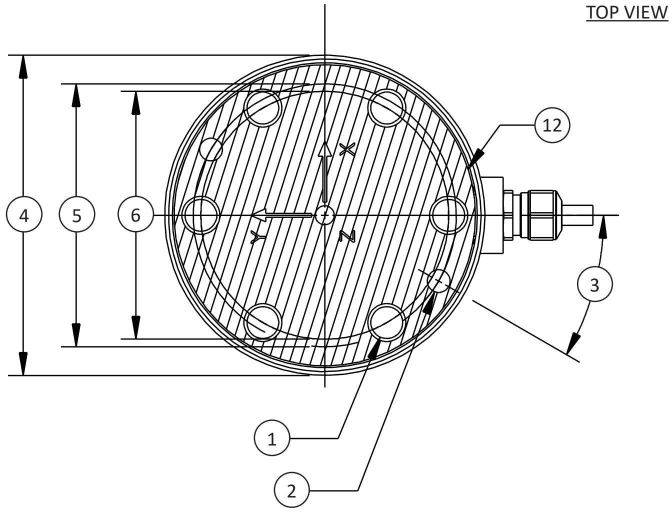
- Collision detection
- “Teach-In”
- Presence or error detection
- Medical / prosthetics / orthopedics
- Gait analysis
- Sports medicine
- Comfort / ergonomics

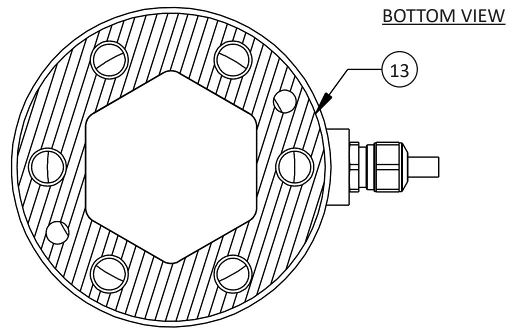
CONNECTOR OPTIONS

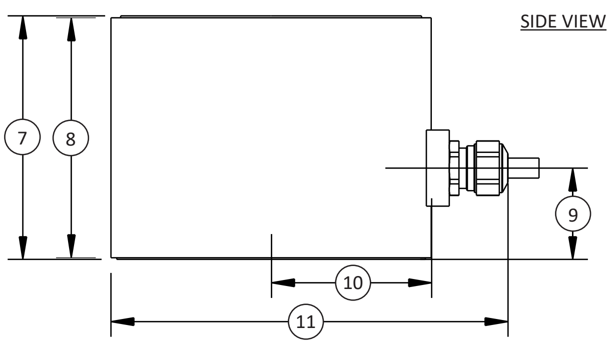
- 24-Pin M16
- 44-Pin High Density D-Sub

DIMENSIONS

See Drawing	Metric	U.S.
	mm	in
(1)	6 x (M10x1.5) ↧ 12	6 x (M10x1.5) ↧ 0.5
(2)	2 x Ø6 H7 ↧ 12	2 x Ø(0.2367/0.2362) ↧ 0.5
(3)	30°	
(4)	Ø84	Ø3.3
(5)	Ø69	Ø2.7
(6)	Ø65	Ø2.6
(7)	64	2.5
(8)	63	2.5
(9)	24	0.9
(10)	42	1.7
(11)	105 (+5)	4.1 (+0.2)
(12)	Bolting Surface / Measuring Platform	
(13)	Bolting Surface	







See adapter plates for 6A68 on the next page
U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

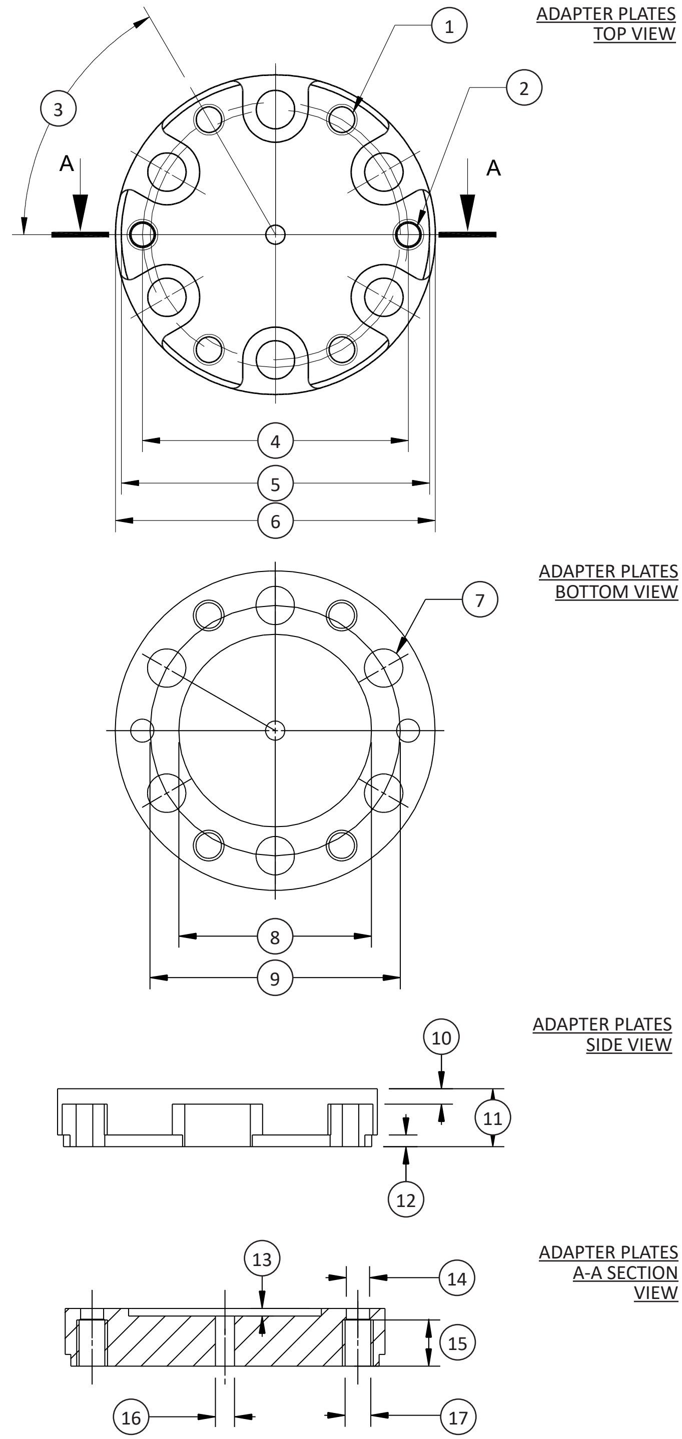
6A68 6-AXIS LOAD CELL (U.S. & METRIC)

ADAPTER PLATES

- Two required per sensor
- Aluminum or stainless steel depending on capacity
- 6A68 only

DIMENSIONS

See Drawing	Metric	U.S.
	mm	in
(1)	4 x (M8x1.25) THRU	4 x (M8x1.25) THRU
(2)	2 x Ø6 H7 THRU, (M8x1.25) ↧ 12 ⌵ 118°	2 x Ø(0.2367/0.2362) THRU, (M8x1.25) ↧ 0.5 ⌵ 118°
(3)	6 x 60°	
(4)	Ø69	Ø2.7
(5)	Ø80 h7	Ø(3.1496/3.1484)
(6)	Ø83	Ø3.3
(7)	6 x Ø10 THRU	6 x Ø0.4 THRU
(8)	Ø50	2.0
(9)	Ø65	2.6
(10)	4	0.2
(11)	15	0.6
(12)	3	0.1
(13)	2	0.08
(14)	Ø6 H7	Ø(0.2367/0.2362)
(15)	12	0.5
(16)	Ø5 h7	Ø(0.1968/0.1964)
(17)	M8x1.25	5/16-24



Adapter Plates (Shown)

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

FORCE MEASUREMENT SOLUTIONS

6A80 6-AXIS LOAD CELL (U.S. & METRIC)

STANDARD CONFIGURATION

Model 6A80 (Shown)

APPLICATIONS

- Collision detection
- “Teach-In”
- Presence or error detection
- Medical / prosthetics / orthopedics
- Force or torque-controlled operation
- Sports medicine
- Comfort / ergonomics

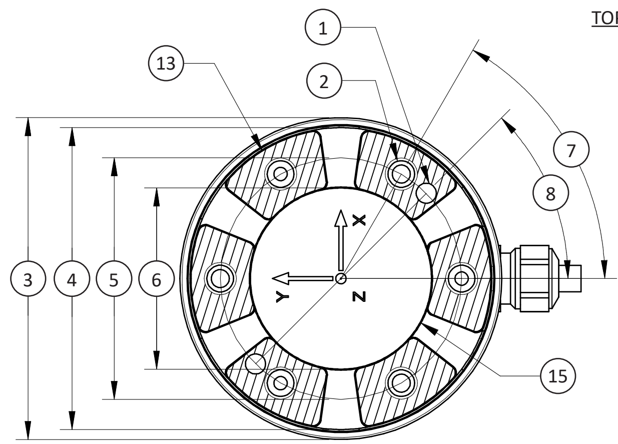
CONNECTOR OPTIONS

- 24-Pin M16
- 44-Pin High Density D-Sub

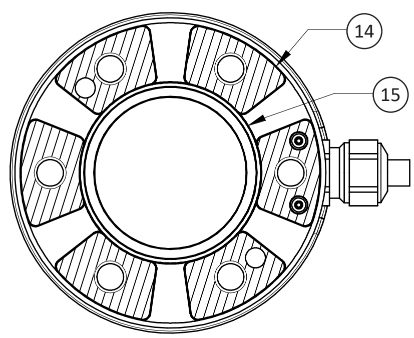
DIMENSIONS

See Drawing	Metric	U.S.
	mm	in
(1)	2 x Ø5 E7 ↧ 6	2 x Ø(0.1981/0.1976) ↧ 0.2
(2)	6 x (M8x1.25) ↧ 9	6 x (M8x1.25) ↧ 0.4
(3)	Ø80	Ø3.1
(4)	Ø75	Ø3.0
(5)	Ø60	Ø2.4
(6)	Ø45 H8 ↧ 3	Ø(1.7732/1.7716) ↧ 0.1
(7)	60°	
(8)	45°	
(9)	50	2.0
(10)	1	0.04
(11)	21.5	0.85
(12)	94 (+1)	3.7 (+0.04)
(13)	Bolting Surface / Measuring Platform	
(14)	Bolting Surface	
(15)	Ø45 H8 – Spigot	Ø(1.7732/1.7716) – Spigot

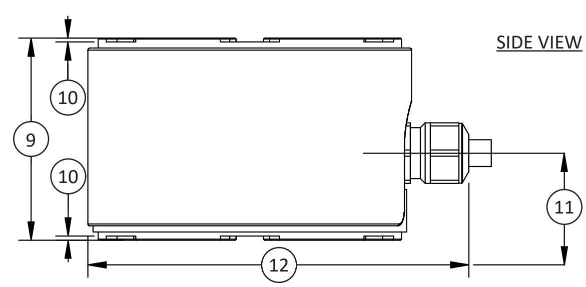
TOP VIEW



BOTTOM VIEW



SIDE VIEW



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FORCE MEASUREMENT SOLUTIONS.

6A110 6-AXIS LOAD CELL (U.S. & METRIC)

STANDARD CONFIGURATION

Model 6A110 (Shown)

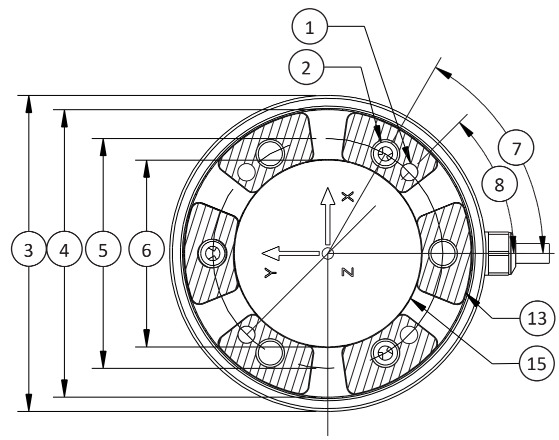
APPLICATIONS

- Collision detection
- “Teach-In”
- Presence or error detection
- Medical / prosthetics / orthopedics
- Force or torque-controlled operation
- Sports medicine
- Comfort / ergonomics

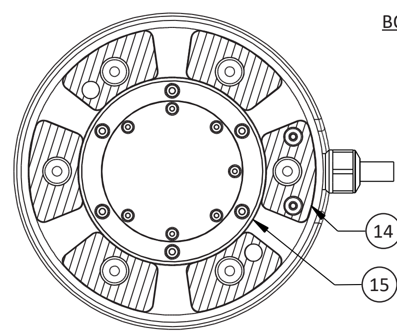
CONNECTOR OPTIONS

- 24-Pin M16
- 44-Pin High Density D-Sub

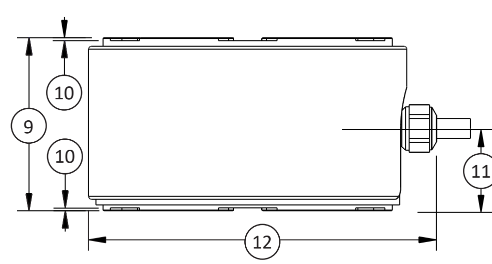
TOP VIEW



BOTTOM VIEW



SIDE VIEW



DIMENSIONS

See Drawing	Metric	U.S.
	mm	in
(1)	2 x Ø6 E7 ↧ 10	2 x Ø(0.2375/0.2370) ↧ 0.4
(2)	6 x (M10x1.5) ↧ 10	6 x (M10x1.5) ↧ 0.4
(3)	Ø110	Ø4.3
(4)	Ø100	Ø3.9
(5)	Ø80	Ø3.1
(6)	Ø65 H8 ↧ 3	Ø(2.5609/2.5590) ↧ 0.1
(7)	60°	
(8)	45°	
(9)	60	2.4
(10)	1	0.04
(11)	28.5	1.12
(12)	120 (±1)	4.7 (±0.04)
(13)	Bolting Surface / Measuring Platform	
(14)	Bolting Surface	
(15)	Ø65 H8 – Spigot	Ø(2.5609/2.5590) – Spigot

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FORCE MEASUREMENT SOLUTIONS.

6A130 6-AXIS LOAD CELL (U.S. & METRIC)

STANDARD CONFIGURATION

Model 6A130 (Shown)

APPLICATIONS

- Collision detection
- “Teach-In”
- Presence or error detection
- Medical / prosthetics / orthopedics
- Force or torque-controlled operation
- Sports medicine
- Comfort / ergonomics

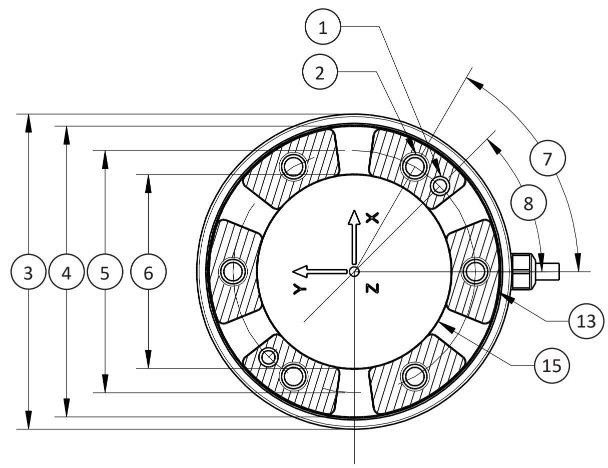
CONNECTOR OPTIONS

- 24-Pin M16
- 44-Pin High Density D-Sub

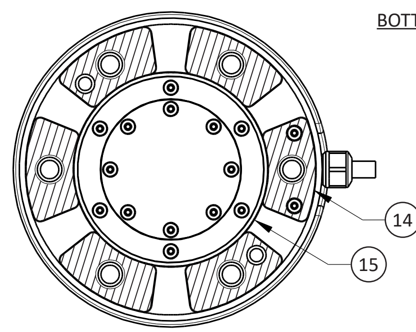
DIMENSIONS

See Drawing	Metric	U.S.
	mm	in
(1)	2 x Ø8 E7 ↧ 15	2 x Ø(0.3165/0.3159) ↧ 0.6
(2)	6 x (M12x1.75) ↧ 15	6 x (M12x1.75) ↧ 0.6
(3)	Ø130	Ø5.1
(4)	Ø120	Ø4.7
(5)	Ø100	Ø3.9
(6)	Ø80 H8 ↧ 3	Ø(3.1514/3.1496) ↧ 0.1
(7)	60°	
(8)	45°	
(9)	80	3.1
(10)	1	0.04
(11)	36	1.4
(12)	140 (±1)	5.5 (±0.04)
(13)	Bolting Surface / Measuring Platform	
(14)	Bolting Surface	
(15)	Ø80 H8 – Spigot	Ø(3.1514/3.1496) – Spigot

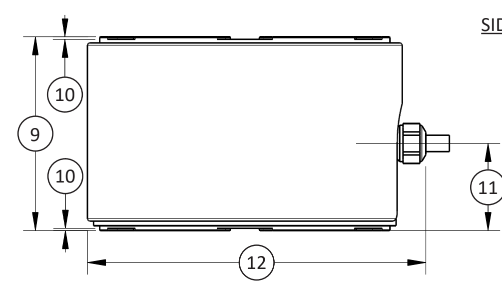
TOP VIEW



BOTTOM VIEW



SIDE VIEW



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FORCE MEASUREMENT SOLUTIONS.

6A154 6-AXIS LOAD CELL (U.S. & METRIC)

STANDARD CONFIGURATION

Model 6A154 (Shown)

APPLICATIONS

- Wind tunnel balances
- Combines low force with high moment capacity

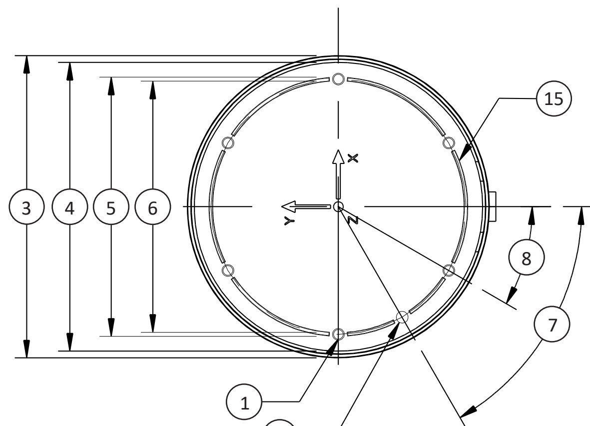
CONNECTOR OPTIONS

- 24-Pin M16
- 44-Pin High Density D-Sub

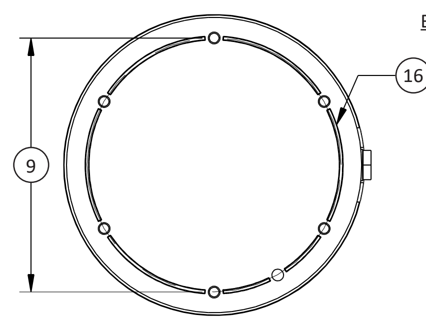
DIMENSIONS

See Drawing	Metric	U.S.
	mm	in
(1)	6 x (M6x1) ↧ 8	6 x (M6x1) ↧ 0.3
(2)	Ø6 E7 ↧ 8	Ø(0.2375/0.2370) ↧ 0.3
(3)	Ø154	Ø6.1
(4)	Ø147	Ø5.8
(5)	Ø132 (+0.000/-0.025)	Ø5.2 (+0.0000/-0.0010)
(6)	Ø128	Ø5.0
(7)	60°	
(8)	30°	
(9)	Ø130	Ø5.1
(10)	100	3.9
(11)	96	3.8
(12)	28	1.1
(13)	77	3.0
(14)	158 (+4)	6.2 (+0.2)
(15)	Bolting Surface / Measuring Platform	
(16)	Bolting Surface	

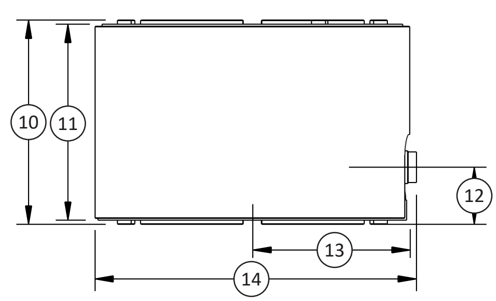
TOP VIEW



BOTTOM VIEW



SIDE VIEW



U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

FORCE MEASUREMENT SOLUTIONS.

6A175 6-AXIS LOAD CELL (U.S. & METRIC)

STANDARD CONFIGURATION

Model 6A175 (Shown)

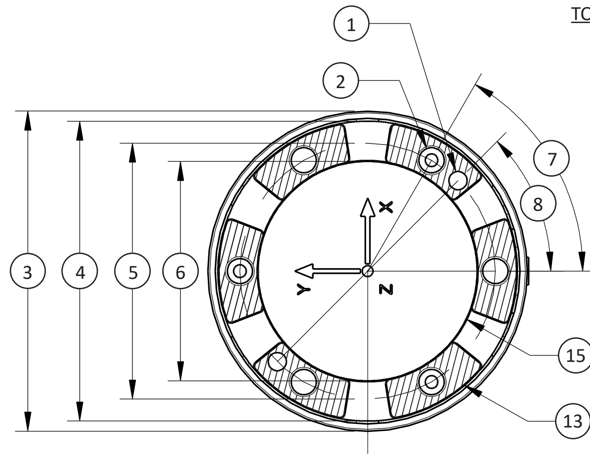
APPLICATIONS

- Automation and robotics
- Press force
- Seismic studies

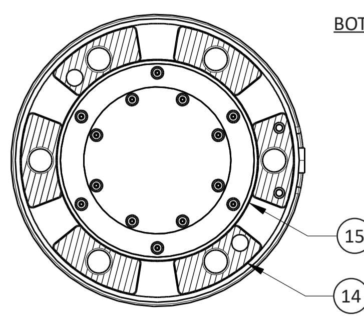
CONNECTOR OPTIONS

- 24-Pin M16
- 44-Pin High Density D-Sub

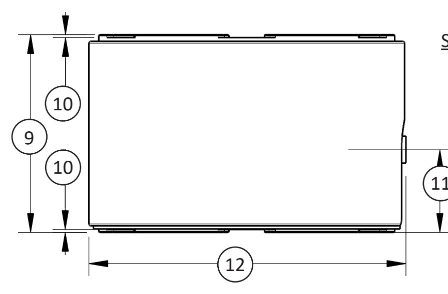
TOP VIEW



BOTTOM VIEW



SIDE VIEW



DIMENSIONS

See Drawing	Metric	U.S.
	mm	in
(1)	2 x Ø10 E7 ↧ 25	2 x Ø(0.3953/0.3947) ↧ 1.0
(2)	6 x (M16x2) ↧ 25	6 x (M16x2) ↧ 1.0
(3)	Ø175	Ø6.9
(4)	Ø164	Ø6.5
(5)	Ø140	Ø5.5
(6)	Ø10 H8 ↧ 4	Ø(4.7265/4.7244) ↧ 0.2
(7)	60°	
(8)	45°	
(9)	110	4.3
(10)	1.7	0.07
(11)	46	1.8
(12)	176 (+3)	6.9 (+0.1)
(13)	Bolting Surface / Measuring Platform	
(14)	Bolting Surface	
(15)	Ø120 H8 – Spigot	Ø(4.7265/4.7244) – Spigot

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

Interface
FORCE MEASUREMENT SOLUTIONS.

6A225 6-AXIS LOAD CELL (U.S. & METRIC)

STANDARD CONFIGURATION

Model 6A225 (Shown)

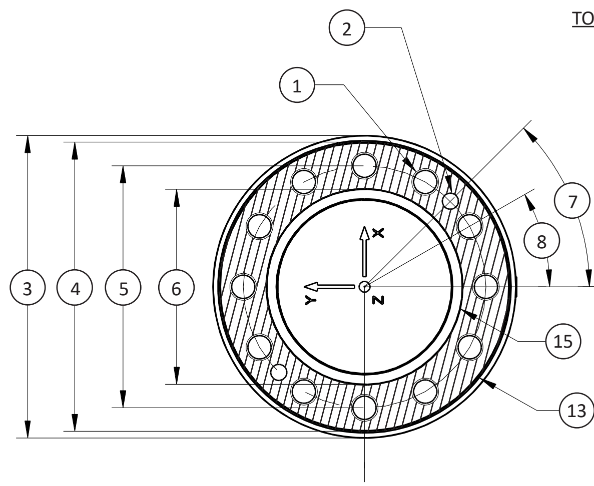
APPLICATIONS

- Automation and robotics

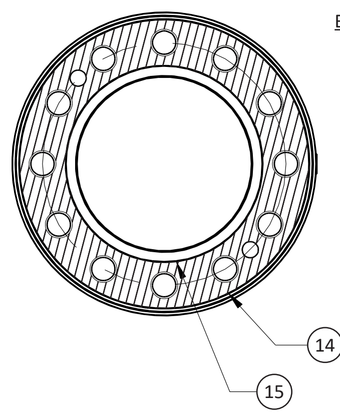
CONNECTOR OPTIONS

- 24-Pin M16
- 44-Pin High Density D-Sub

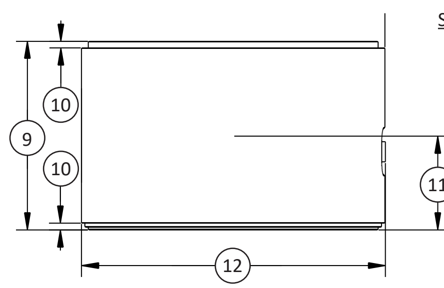
TOP VIEW



BOTTOM VIEW



SIDE VIEW



DIMENSIONS

See Drawing	Metric	U.S.
	mm	in
(1)	12 x ØM20x2.5 ↧ 25 ⌵ 118°	12 x ØM20x2.5 ↧ 1.0 ⌵ 118°
(2)	2 x Ø12 E7 ↧ 18	2 x Ø(0.4744/0.4737)
(3)	Ø225	Ø8.9
(4)	Ø215	Ø8.5
(5)	Ø180	Ø7.1
(6)	Ø145 H8 ↧ 4	Ø(5.7111/5.7086) ↧ 0.2
(7)	45°	
(8)	30°	
(9)	140	5.5
(10)	5	0.2
(11)	69.48	2.735
(12)	225.5 (+3)	8.88 (+0.1)
(13)	Bolting Surface / Measuring Platform	
(14)	Bolting Surface	
(15)	Centering ↧ 3.5	Centering ↧ 0.14

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

FORCE MEASUREMENT SOLUTIONS.

1216 AXIAL TORSION LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Measures load and torque
- Minimal crosstalk
- ExtraneoU.S. load resistance
- Fatigue rated

Specifications

		Axial Bridge A	Torsion Bridge B
ACCURACY – (MAX ERROR)			
Nonlinearity – %FS		±0.04	±0.07
Hysteresis – %FS		±0.04	±0.05
Nonrepeatability – %RO		±0.02	±0.05
Creep, in 20 min – %		±0.025	±0.025
TEMPERATURE			
Effect on Zero – %RO / 100°F MAX		±0.08	±0.08
Effect on Output – % / 100°F MAX		±0.08	±0.08
Compensated Range	°F	+15 to +115	+15 to +115
	°C	-10 to +45	-10 to +45
Operating Range	°F	-65 to +200	-65 to +200
	°C	-55 to +90	-55 to +90
ELECTRICAL			
Rated Output – mV/V (Nominal)		1.50	1.80
Zero Balance – %RO		±2.0	±2.0
Input Resistance – Ohms		700 ±7	700 ±7
Output Resistance – Ohms		700 ±7	700 ±7
Excitation Voltage – VDC MAX		20	20
MECHANICAL			
Calibration		T & C	CW & CCW
Safe Overload – %CAP		±200	±200
Ultimate Overload – %CAP		±400	±400
Material		Aluminum	

STANDARD CONFIGURATION

Model 1216CEW-2K (Shown)

OPTIONS

- Connector protection
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- CU.S.tom calibration
- Special Temperature range

ACCESSORIES

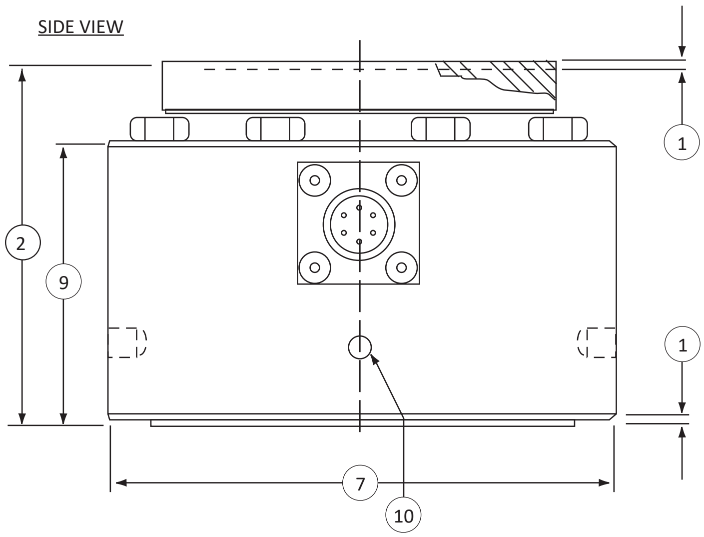
- Mating connector
- Instrumentation

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

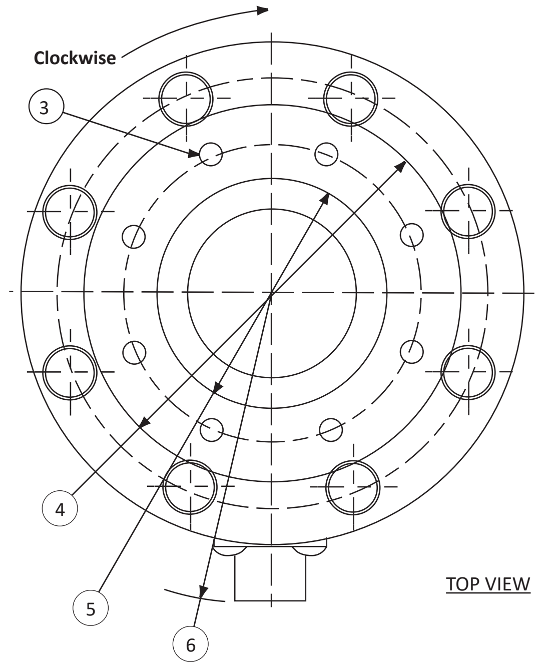
interface
FORCE MEASUREMENT SOLUTIONS.

1216 AXIAL TORSION LOAD CELL (U.S. & METRIC)

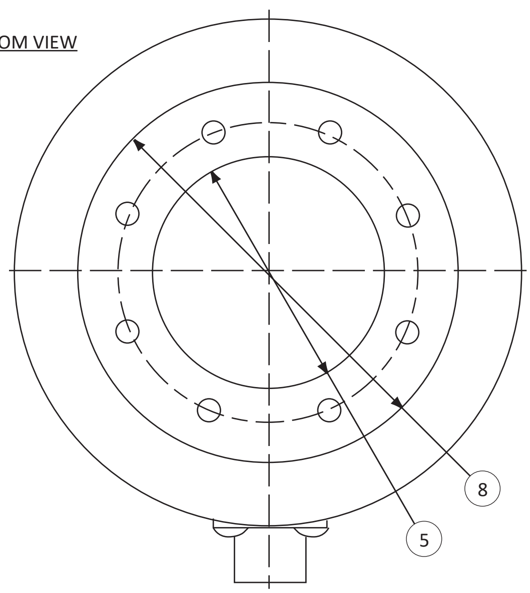
SIDE VIEW



TOP VIEW



BOTTOM VIEW



Dimensions

See Drawing	CAPACITY	
	U.S. (lbf/lbf-in)	**Metric (kN/Nm)**
	250/125, 500/250, 1K/500, 2K/1K	**1.11/14.1, 2.22/28.2, 4.45/56.5, 8.9/113**
	in	**mm**
(1)	0.070	1.78
(2)	3.00	76.2
(3)	(¼-28) UNFx ↧ 0.43 on a 2.600 B.C.	(¼-28) UNF x ↧ 10.9 on a 66.04 B.C.
(4)	Ø3.20	Ø81.3
(5)	Ø2.000 (+0.002 / -0.000)	Ø50.80 (+0.51/-0.00)
(6)	2.77	70.3
(7)	Ø4.13	Ø104.3
(8)	Ø3.200	Ø81.28
(9)	2.33	59.2
(10)	Ø0.25 ↧ 0.25	Ø6.4 ↧ 6.4

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

interface
FORCE MEASUREMENT SOLUTIONS

1516 AXIAL TORSION LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacity: Axial lbf (kN) / Torsion lbf-in (Nm) – 100(0.44) / 50(5.6)
- Axial force torque
- Minimal crosstalk
- Fatigue rated

Specifications

		Axial Bridge A	Torsion Bridge B
ACCURACY – (MAX ERROR)			
Nonlinearity – %FS		±0.04	±0.05
Hysteresis – %FS		±0.04	±0.05
Nonrepeatability – %RO		±0.02	±0.05
Creep, in 20 min – %		±0.025	±0.025
TEMPERATURE			
Effect on Zero – %RO / 100°F – MAX		±0.15	±0.15
Effect on Output – % / 100°F – MAX		±0.08	±0.08
Compensated Range	°F	+15 to +115	+15 to +115
	°C	-10 to +45	-10 to +45
Operating Range	°F	-65 to +200	-65 to +200
	°C	-55 to +90	-55 to +90
ELECTRICAL			
Rated Output – mV/V (T & C)		±1.50 ±0.15	±1.50 ±0.15
Zero Balance – %RO MAX		±2.0	±2.0
Input Resistance – Ohms		700 ±7	700 ±7
Output Resistance – Ohms		700 ±7	700 ±7
Excitation Voltage – VDC MAX		20	20
MECHANICAL			
Calibration		T & C	CW & CCW
Safe Overload – %CAP		±200	±200
Ultimate Overload – %CAP		±400	±400
Material		Alluminum	

STANDARD CONFIGURATION

Model 1516DXB-100 (Shown)

OPTIONS

- Connector protection
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- CU.S.tom calibration
- Multiple bridge
- Special threads
- Special Temperature range

ACCESSORIES

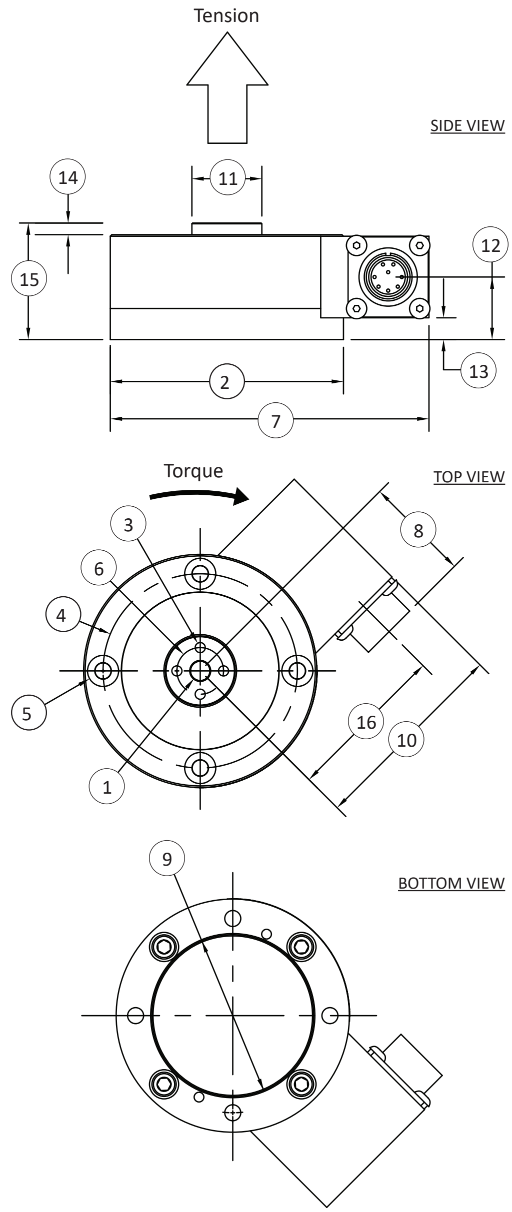
- Mating connector
- Instrumentation
- Loading hardware

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

1516 AXIAL TORSION LOAD CELL (U.S. & METRIC)

Dimensions

See Drawing	CAPACITY	
	U.S. (lbf/lbf-in)	Metric (kN/Nm)
	100 / 50	0.44 / 5.6
	in	mm
(1)	Ø 0.250 (±0.0005), ↧ 0.15	Ø 6.35 (±0.013), ↧ 76.2
(2)	Ø 3.00	Ø 76.2
(3)	M4x0.7-6H, ↧ 0.31	
(4)	Ø 2.500	Ø 63.5
(5)	⌴ for an M5 4 hole EQ SP oriented as shown	
(6)	Ø 0.600	Ø 15.24
(7)	Ø 4.10	Ø 76.2
(8)	1.36	34.5
(9)	Ø 2.082 (+0.005/-0.000), ↧ 0.10	Ø 52.88 (+0.03/-0.00), ↧ 2.5
(10)	2.60	66.0
(11)	Ø 0.90	Ø 22.9
(12)	0.81	20.6
(13)	0.28	7.1
(14)	0.15	3.81
(15)	1.50	38.1
(16)	2.08	52.8



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FORCE MEASUREMENT SOLUTIONS.

2816 AXIAL TORSION LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Measures load and torque simultaneoU.S.ly
- ExtraneoU.S. load resistance
- Minimal crosstalk
- Fatigue rated

Specifications

		Axial Bridge A	Axial Bridge B
ACCURACY – (MAX ERROR)			
Nonlinearity – %FS		±0.05	±0.07
Hysteresis – %FS		±0.05	±0.05
Nonrepeatability – %RO		±0.02	±0.05
Creep, in 20 min – %		±0.025	±0.025
TEMPERATURE			
Effect on Zero – %RO MAX	°F	±0.0015	±0.0015
	°C	±0.0027	±0.0027
Effect on Output – % MAX	°F	±0.0008	±0.0008
	°C	±0.0015	±0.0015
Compensated Range	°F	+15 to +115	+15 to +115
	°C	-10 to +45	-10 to +45
Operating Range	°F	-65 to +200	-65 to +200
	°C	-55 to +90	-55 to +90
ELECTRICAL			
Rated Output – mV/V (T & C)		+2.0 ±0.3 / -2.0 ±0.3	
Zero Balance – %RO MAX		±2.0	±2.0
Input Resistance – Ohms		350 ±3.5	700 ±7
Output Resistance – Ohms		350 ±3.5	700 ±7
Excitation Voltage – VDC MAX		20	20
MECHANICAL			
Calibration		T & C	CW & CCW
Safe Overload – %CAP MAX		±200	±200
Ultimate Overload – %CAP MAX		±400	±400
Material		Alloy steel	

STANDARD CONFIGURATION

MODEL 2816DYM-10K (Shown)

OPTIONS

- Base (recommended)
- Connector protection
- Standardized output
- Transducer Electronic Data Sheet (TEDS)
- CU.S.tom calibration
- Multiple bridge
- Special threads
- Dual diaphragm
- Special Temperature range
- Cable length
- Add connector to cable

CONNECTOR OPTIONS

- Integral cable 10 ft (3 m)
- PT02E-10-6P bayonet connector
- PC04E-10-6P screw-type connector

ACCESSORIES

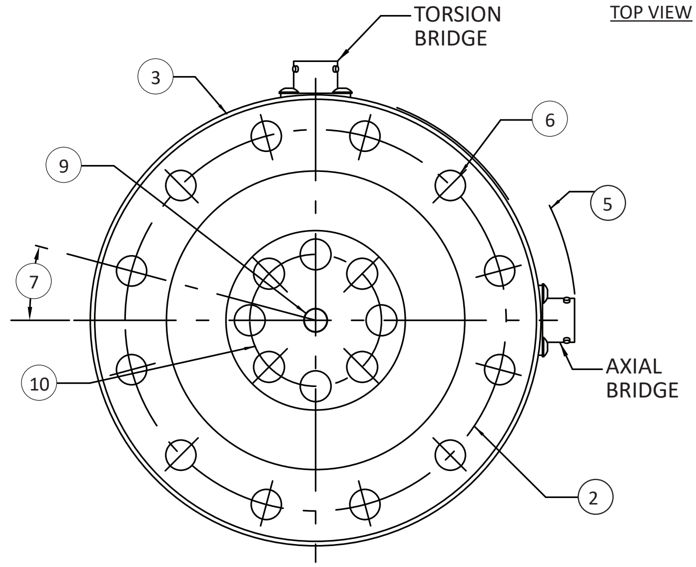
- Mating connector
- Instrumentation
- Loading hardware

2816 AXIAL TORSION LOAD CELL (U.S. & METRIC)

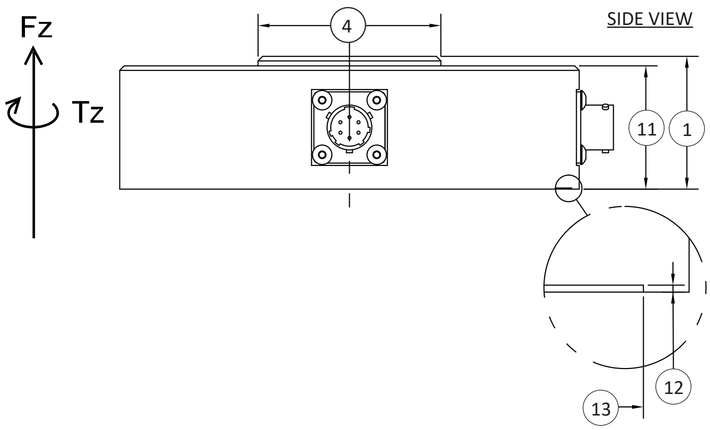
Dimensions

See Drawing	CAPACITY	
	U.S. (lbf/lbf-in)	Metric (N/Nm)
	3.3K/2K, 5K/3K 10K/6K, 15K/7.5K	**16K/220, 25K/340 45K/680, 63K/900**
	in	mm
1	1.75	44.4
2	5.120	130.18
3	6.06	153.9
4	2.41	61.2
5	3.55	90.2
6	0.41	10.3
7	15°	
8	Ø0.41 THRU, ⌵ 90°, Ø0.46	Ø10.5 THRU, ⌵ 90°, Ø11.7
9	Ø0.31 THRU, ⌴ Ø0.3155–3166, ↧ 0.39 – This side only	Ø7.8 THRU, ⌴ Ø8.014–8.042, ↧ 10.0 – This side only
10	1.772	45.00
11	1.62	41.3
12	0.015	0.38
13	Ø5.86	Ø148.8
14	Ø4.30	Ø109.2
15	Ø4.01	Ø101.9

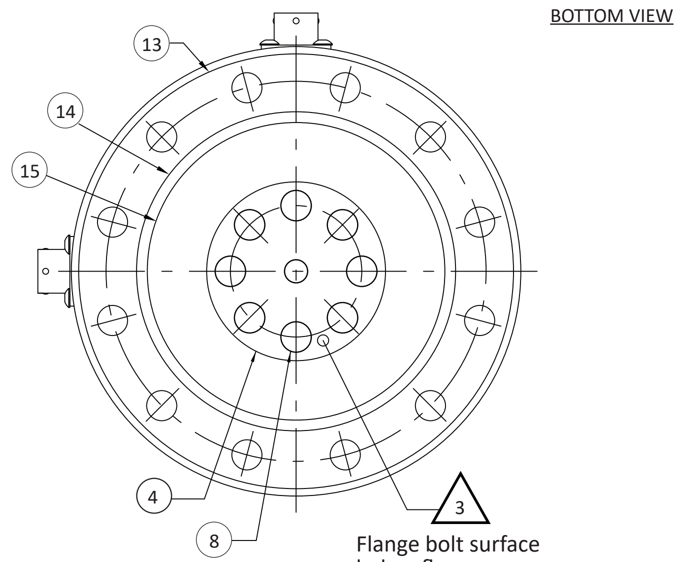
TOP VIEW



SIDE VIEW



BOTTOM VIEW

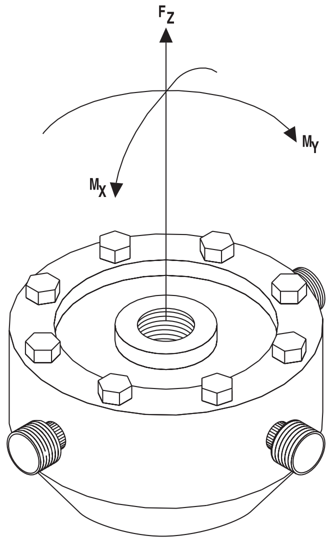


Flange bolt surface below flexure mounting rings 0.015 in (0.38mm)

5200 MULTI-AXIS LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- SimultaneoU.S.ly measures thrU.S.t and moment perpendicular to the thrU.S.t axis
- ThrU.S.t axis functions to the same Specifications as a Model 1200
- ThrU.S.t stiffness and moment stiffness are both very high becaU.S.e of the low profile construction



PERFORMANCE PARAMETERS

Model 5200	RATED THRU.S.T		RATED MOMENT	
	U.S. (lbf)	Metric (kN)	U.S. (lbf-in)	Metric (Nm)
5210XYZ-1K	1K	4.45	400	45.2
5210XYZ-2K	2K	8.9	800	90.4
5210XYZ-5K	5K	22.2	1K	113
5210XYZ-10K	10K	44.5	2K	226
5220XYZ-25K	25K	111	10K	1.13K
5220XYZ-50K	50K	222	20K	2.26K

STANDARD CONFIGURATION

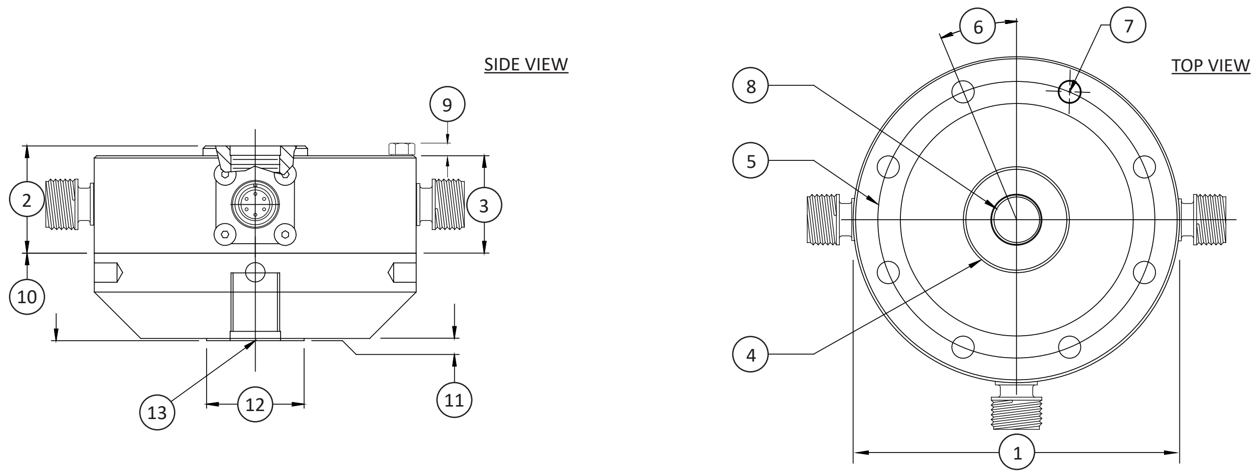
Model 5200 (shown)

Specifications

Static Error Band – ThrU.S.t	1K-10K	±0.04
	25K & 50K	±0.05
Deflection – ThrU.S.t – FS	in	0.001 to 0.002
	mm	0.03 to 0.05
Calibration – ThrU.S.t		Same as 1200 Series Universal
Deflection – Moment – FS / sec		From 20 (depending on range)
Output - Moment – mV/V		Approx. ½ of rated thrU.S.t output
Cross-Talk - Moment – %		1 or less
Calibration Uncertainty – Moment – %		±1

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

5200 MULTI-AXIS LOAD CELL (U.S. & METRIC)



Dimensions

See Drawing	MODEL			
	5210		5220	
	CAPACITY			
	U.S. (lbf)	Metric (kN)	U.S. (lbf)	Metric (kN)
	1K, 2K, 5K, 10K,	1.5, 2.5, 5, 10, 25, 50	25K, 50K	100, 250
	in	mm	in	mm
(1)	Ø4.13	Ø104.8	Ø6.06	Ø153.9
(2)	1.38	34.9	1.75	44.5
(3)	1.25	31.7	1.63	41.4
(4)	Ø1.34	Ø34.0	Ø2.65	Ø67.3
(5)	Ø3.50	Ø88.9	Ø5.13	Ø130.3
(6)	22.5°	22.5°	15.0°	15.0°
(7)	Ø0.28	Ø7.1	Ø0.41	Ø10.4
	8 places		12 places	
(8)	5/8-18 UNF-3B ↧ 1.12	M16 x 2-4H ↧ 28.4	1 1/4-12 UNF-3B ↧ 1.40	M33 x 2-4H ↧ 35.6
(9)	0.20	5.10	0.30	7.60
(10)	1.13	28.6	1.75	44.5
(11)	0.03	0.8	0.03	0.8
(12)	Ø1.25	Ø31.8	Ø2.25	Ø57.2
(13)	5/8-18 UNF-3B ↧ 0.87	M16 x 2-4H ↧ 22.1	1 1/4-12 UNF-3B ↧ 1.40	M33 x 2-4H ↧ 35.6

Catalog 2019 06-15-2020

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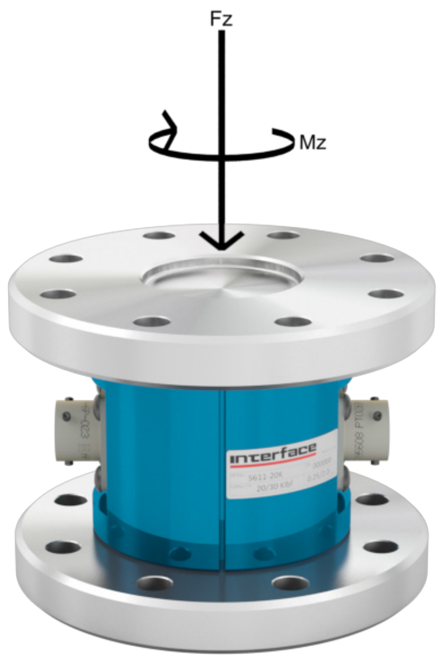
FORCE MEASUREMENT SOLUTIONS.

5600 AXIAL TORSION FORCE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities: Force lbf(kN) / Torque lbf-in(Nm) – from 6K(26.7)/5K(565) to 180K(801)/300K(33.9K)
- Measures compressive force and torque
- Low cross talk
- High stiffness
- ExtraneoU.S. load resistance

STANDARD CONFIGURATION



Model 5611-20K (Shown)

interface
FORCE MEASUREMENT SOLUTIONS.

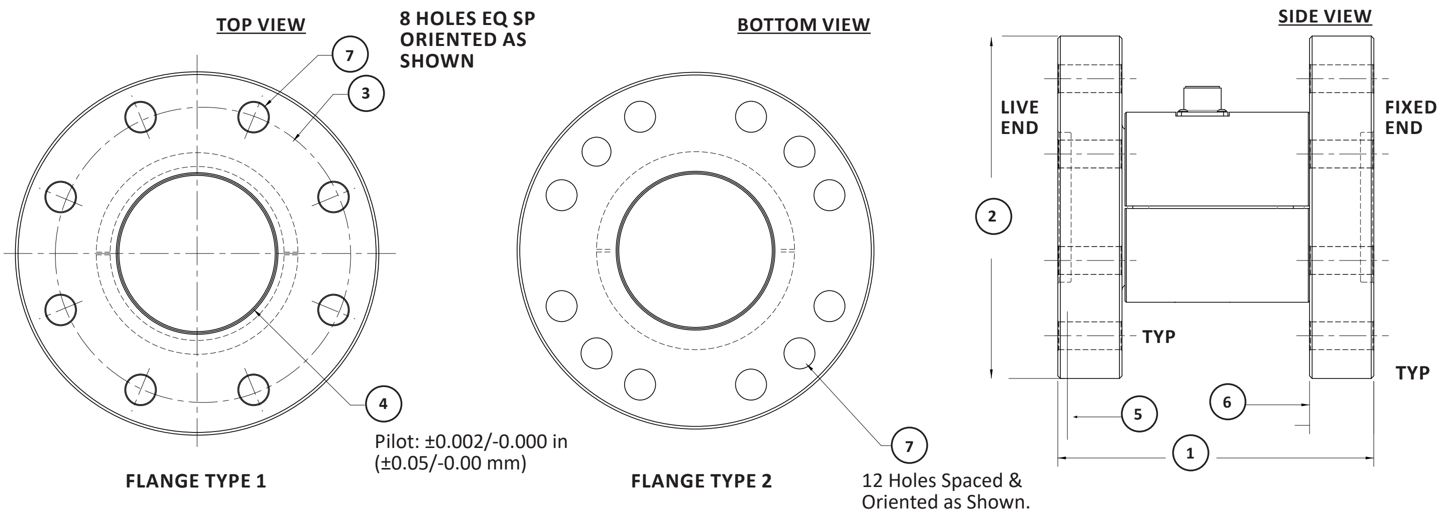
5600 AXIAL TORSION FORCE TRANSDUCER (U.S. & METRIC)

Specifications

MODEL			5610-5K	5611 - 20K	5612 - 100K	5613 - 200K	5614 - 300K
CAPACITY							
Mz	lbf-in		5K	20K	100K	200K	300K
	Nm		560	2.2K	11K	22K	33K
Fz (Compression)	lbf		6K	30K	100K	150K	180K
	kN		27	130	450	670	800
ACCURACY							
Nonlinearity – %FS			±0.1	±0.1	±0.1	±0.1	±0.1
Hysteresis – %FS			±0.1	±0.1	±0.1	±0.1	±0.1
Nonrepeatability – %RO			±0.02	±0.02	±0.02	±0.02	±0.02
TEMPERATURE							
Temperature Effect on Zero – %RO MAX	°C	Fz	±0.007	±0.007	±0.007	±0.007	±0.007
		Mz	±0.004	±0.004	±0.004	±0.004	±0.004
	°F	Fz	±0.004	±0.004	±0.004	±0.004	±0.004
		Mz	±0.002	±0.002	±0.002	±0.002	±0.002
Temperature Effect of Output – % MAX	°C		±0.004	±0.004	±0.004	±0.004	±0.004
	°F		±0.002	±0.002	±0.002	±0.002	±0.002
Compensated Range	°C		+21 to +77	+21 to +77	+21 to +77	+21 to +77	+21 to +77
	°F		+70 to +170	+70 to +170	+70 to +170	+70 to +170	+70 to +170
Operating Range	°C		-54 to +93	-54 to +93	-54 to +93	-54 to +93	-54 to +93
	°F		-65 to +200	-65 to +200	-65 to +200	-65 to +200	-65 to +200
ELECTRICAL							
Rated Output – mV/V (Nominal)	Fz		0.25	0.5	0.5	0.5	0.5
	Mz		2	2	2	2	2
Excitation Voltage – VDC MAX			20	20	20	20	20
Bridge Resistance – Ohm (Nominal)			350	350	350	350	350
Electrical Connection			MS3102E-14S-5P	MS3102E-14S-5P	MS3102E-14S-5P	MS3102E-14S-5P	MS3102E-14S-5P
MECHANICAL							
Safe Overload – % CAP			±150	±150	±150	±150	±150
Deflection at Capacity – (in/rad)	Fz		0.001	0.001	0.002	0.002	0.002
	Mz		0.005	0.004	0.005	0.006	0.005
Overhung Moment – lbf-in MAX			2	10	50	90	200
Side load – lbf MAX			2K	7K	20K	30K	55K

FORCE MEASUREMENT SOLUTIONS.

5600 AXIAL TORSION FORCE TRANSDUCER (U.S. & METRIC)



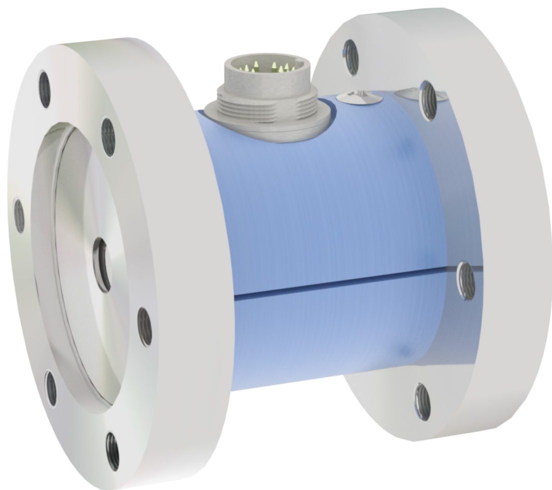
DIMENSIONS

SEE DRAWING	MODEL									
	5610		5611		5612		5613		5614	
	CAPACITY									
	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)	U.S. (lbf-in)	Metric (Nm)
	5K	550	20K	2.2K	100K	11K	200K	22K	300K	33K
	in	mm	in	mm	in	mm	in	mm	in	mm
(1)	3.00	76.2	3.50	88.9	7.38	187.5	8.50	215.9	10.50	266.7
(2)	4.00	101.6	5.00	127.0	8.00	203.2	9.75	247.7	14.00	355.6
(3)	3.25	82.6	4.25	108.0	6.50	165.1	8.00	203.2	11.0	279.4
(4)	1.500	38.10	2.000	50.80	3.500	88.90	4.000	101.60	6.000	152.40
(5)	0.13	3.3	0.25	6.4	0.31	7.9	0.31	7.9	0.31	7.9
(6)	0.50	12.7	0.75	19.1	1.50	38.1	1.50	38.1	2.00	50.8
(7)	0.328	8.33	0.390	10.41*	0.650	16.51	0.781*	20.65	1.031	24.64*
Flange Type	1		1		2		2		1	
Recommended mtg screw size – lbf-in/Nm	5/16 - 24	M8 x 1.25	⅜ - 24	M10 x 1.5	⅝ - 18	M16 x 2	¾ - 16	M20 x 2.5	1 - 12	M24 x 3
Recommended mtg torque – lbf-in/Nm	300	34	600	68	2400	270	4400	500	9000	1000

***** *Metric Model 5611, 5613, & 5614 have larger mounting holes than their equivalents to accommodate Standard Metric*

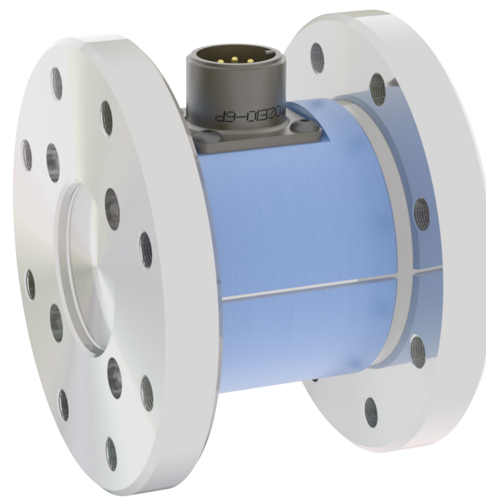
AT101 AXIAL TORSION FORCE & TORQUE TRANSDUCER (U.S. & METRIC)

FLANGE TYPE 1



Model AT101-2/50

FLANGE TYPE 2



Model AT101-20/20

FEATURES & BENEFITS

- Capacities: Force kN(lbf) / Torque Nm(lbf-in)-
  0.5(112) / 5(44.3), 1(225) / 10(88.5),
  1(225) / 30(266), 20(4.5K) / 20(177),
  0.5(112) / 50(443), 2(450) / 50(443),
- Measures force & torque in one unit
- Thru-hole

OPTIONS

- 100% Cal Control (Internal Shunt Cal)

CAPACITIES

Model	Force		Torque		Flange Type
	kN	lbf	Nm	lbf-in	
AT101 – 0.5/5	0.5	112	5	44.3	1
AT101 – 1/10	1	225	10	88.5	1
AT101 – 1/30	1	225	30	266	1
AT101 – 20/20	20	4.5K	20	177	2
AT101 – 0.5/50	0.5	112	50	443	1
AT101 – 2/50	2	450	50	443	1

Specifications

ACCURACY – (MAX ERROR)		
Nonlinearity – torque %FS		± 0.2
Hysteresis – torque %FS		± 0.2
Nonlinearity – torque %FS		± 0.3
Hysteresis – torque %FS		± 0.3
Hysteresis – %FS		± 0.2
Nonrepeatability – %RO		± 0.1
Cross talk – %FS		< 1%
TEMPERATURE		
Effect on Zero – %RO / °C		± 0.02
Effect on Output – % / °C		± 0.02
Compensated Range	°C	-5 to +45
	°F	+23 to +113
Operating Range	°C	-15 to +55
	°F	+5 to +131
ELECTRICAL		
Output – mV/V		1
Excitation Voltage – VDC		2-12
Bridge Resistance – torque – ohm		350
Bridge Resistance – force – ohm		700
MECHANICAL		
Safe Overload – %RO		150
Protection Level		IP50
Material		Alloy Steel

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

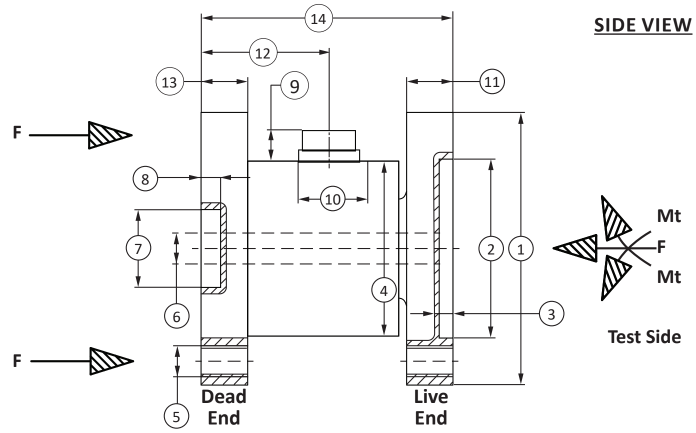
FORCE MEASUREMENT SOLUTIONS.

AT101 AXIAL TORSION FORCE & TORQUE TRANSDUCER (U.S. & METRIC)

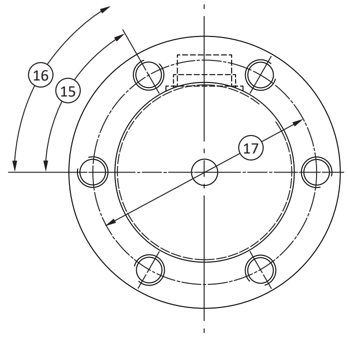
Dimensions: FLANGE TYPE 1

Model	AT101 – 0.5/5, 1/10, 1/30, 0.5/50, 2/50			
	Force (kN)	Torque (Nm)	Force (lbf)	Torque (lbf-in)
Capacity	0.5	5	112	44.3
	1	10	225	88.5
	1	30	225	266
	0.5	50	112	443
	2	50	450	443
See Drawing	Metric (mm)		U.S. (in)	
(1)	Ø70		Ø2.8	
(2)	Ø46 H7		Ø(1.8110/1.8100)	
(3)	3.5		0.1	
(4)	Ø45		Ø1.8	
(5)	M8			
(6)	Ø8		Ø0.3	
(7)	Ø20 H7		Ø(0.7874/0.7866)	
(8)	5 (+0.2)		0.197 (±0.008)	
(9)	8		0.3	
(10)	Ø18		Ø0.7	
(11)	12		0.5	
(12)	33		1.3	
(13)	12		0.5	
(14)	65 (±0.1)		2.559 (±0.004)	
(15)	60°			
(16)	6x60° (360°)			
(17)	Ø58 (±0.1)		Ø2.283 (±0.004)	

SIDE VIEW



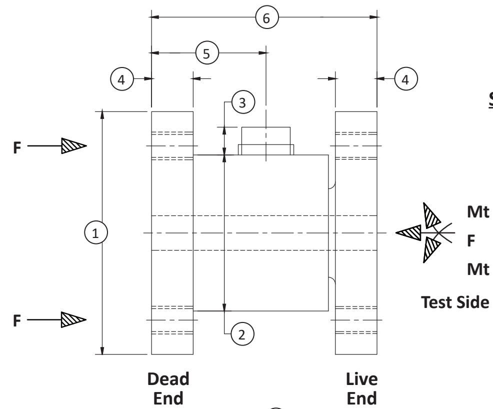
TOP VIEW



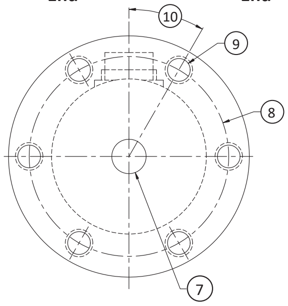
Dimensions: FLANGE TYPE 2

Model	AT101 - 20/20			
	Force (kN)	Torque (Nm)	Force (lbf)	Torque (lbf-in)
Capacity	20	20	4.5K	177
See Drawing	Metric (mm)		U.S. (in)	
(1)	Ø70		Ø2.8	
(2)	Ø45		Ø1.8	
(3)	8		0.3	
(4)	12		0.5	
(5)	33		1.3	
(6)	65		2.6	
(7)	Ø6 H7 ↧ (≥6)		Ø(0.2362/0.2357) ↧ (≥0.2)	
(8)	Ø58 (±0.1)		Ø2.283 (±0.004)	
(9)	M8			
(10)	12x30°(360°)			

SIDE VIEW



TOP VIEW



U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

AT102 AXIAL TORSION FORCE & TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacity: Force kN(lbf) / Torque Nm(lbf-in) – 10(2.25K) / 10(88.5)
- Compact design
- Side cable exit

OPTIONS

- Internal shunt resistor – 100% output

Specifications

ACCURACY – (MAX ERROR)		
Nonlinearity – Torque %FS		± 0.2
Hysteresis – Torque %FS		± 0.2
Nonrepeatability – %RO		± 0.08
Cross Talk – %FS		< 1
Creep, in 30 min – %		± 0.1
TEMPERATURE		
Effect on Zero – %RO / °C		± 0.02
Effect on Output – % / °C		± 0.02
Compensated Range	°C	-10 to +50
	°F	+14 to +122
Operating Range	°C	-30 to +80
	°F	-22 to +176
ELECTRICAL		
Output – mV/V ± %		1 ±15
Excitation Voltage – VDC		2-12
Bridge Resistance – Ohm		350
Electrical Connection	m	2 cables (3 each)
	ft	2 cables (9.8 each)
MECHANICAL		
Safe Overload – %RO		150
IP Rating		IP40
Material		Alloy steel

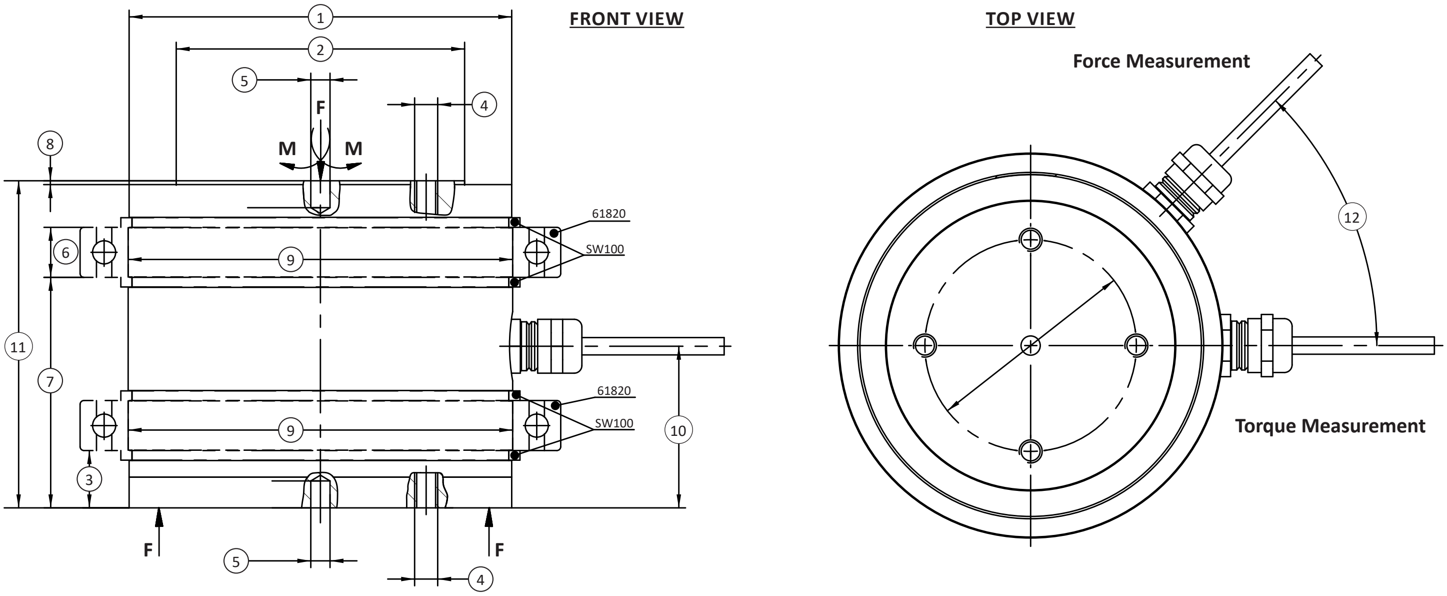
STANDARD CONFIGURATION

Model AT102 (Shown)

Catalog 2019 06-15-2020

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

AT102 AXIAL TORSION FORCE & TORQUE TRANSDUCER (U.S. & METRIC)



Dimensions

See Drawing	Metric (kN/Nm)	U.S. (lbf/lbf-in)
	10/10	2.25K/88.5
	mm	in
(1)	Ø 99.5$^{-0.2}$	Ø 3.92$^{-0.008}$
(2)	Ø 75$^{-0.1}$	Ø 3.0$^{-0.004}$
(3)	15	0.6
(4)	M6 ↧ 8	
(5)	Ø5 H7	Ø(1.1835/1.1827)
(6)	13	0.5
(7)	60	2.4
(8)	1	0.04
(9)	Ø100g6	Ø(3.9365/3.9357)
(10)	42	1.7
(11)	85	3.3
(12)	45°	

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

AT103 AXIAL TORSION FORCE & TORQUE TRANSDUCER (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities: Force kN(lbf) / Torque Nm(lbf-in) – 10 (2.25K) / 10 (88.5), 20 (4.5K) / 20 (177)
- Compact design
- Bottom cable exit

Specifications

ACCURACY – (MAX ERROR)		
Nonlinearity – Torque %FS		± 0.2
Hysteresis – Torque %FS		± 0.2
Nonrepeatability – %RO		± 0.08
Crosstalk – %FS		< 1
Creep, in 30 min – %		± 0.1
TEMPERATURE		
Effect on Zero – %RO / °C		± 0.02
Effect on Output – % / °C		± 0.02
Compensated Range	°C	0 to +100
	°F	+32 to +212
Operating Range	°C	-30 to +120
	°F	-22 to +248
ELECTRICAL		
Output – mV/V ± %		1 ±0.5
Excitation Voltage – VDC		2-12
Bridge Resistance – Ohm		350
Electrical Connection	m	2 cables (3 each)
	ft	2 cables (9.8 each)
MECHANICAL		
Safe Overload – %RO		150
IP Rating		IP40
Material		Alloy steel

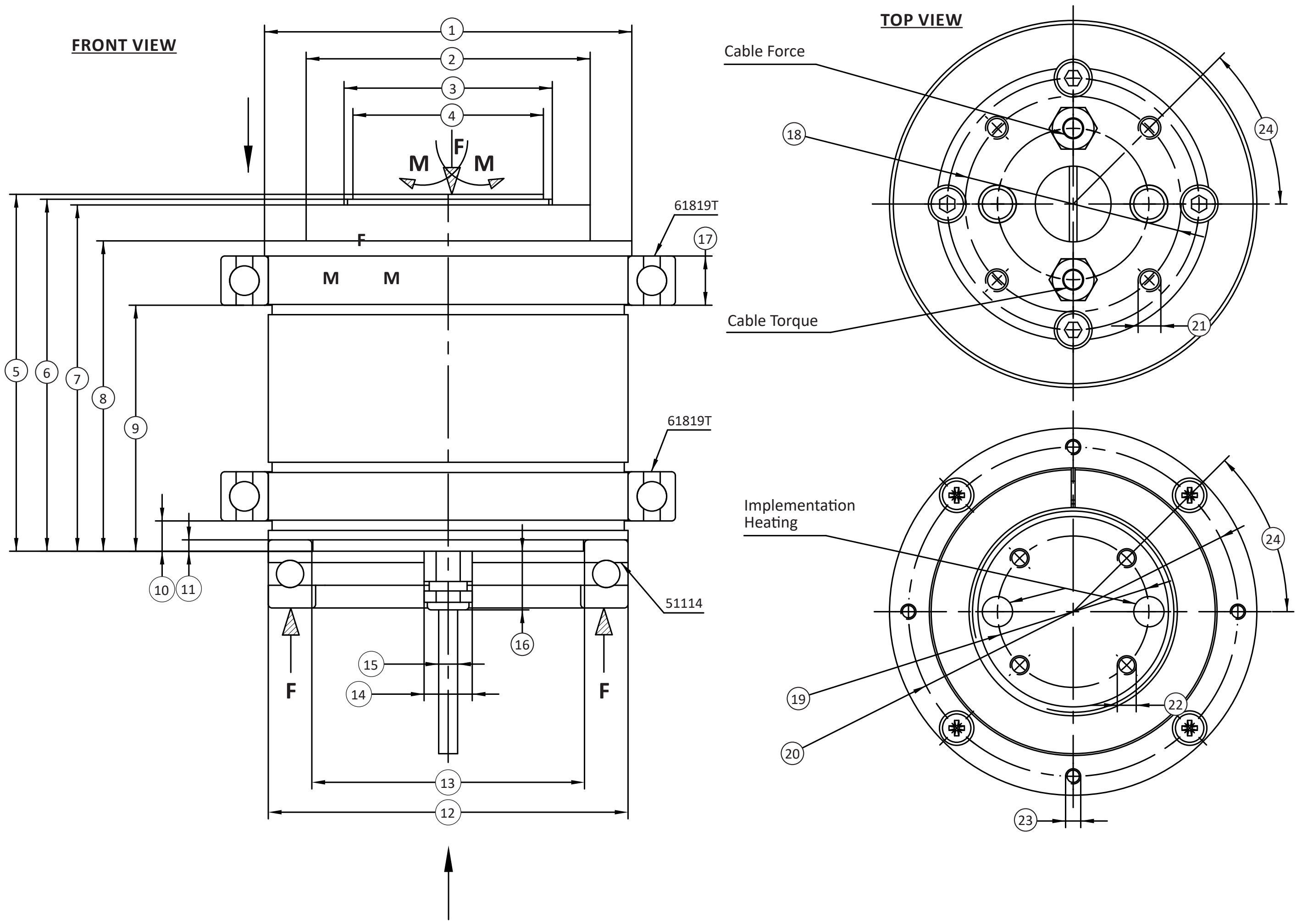
STANDARD CONFIGURATION

Model AT103 (Shown)

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

AT103 AXIAL TORSION FORCE & TORQUE TRANSDUCER (U.S. & METRIC)

Dimensions



U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

AT103 AXIAL TORSION FORCE & TORQUE TRANSDUCER (U.S. & METRIC)

Dimensions (CONTINUED)

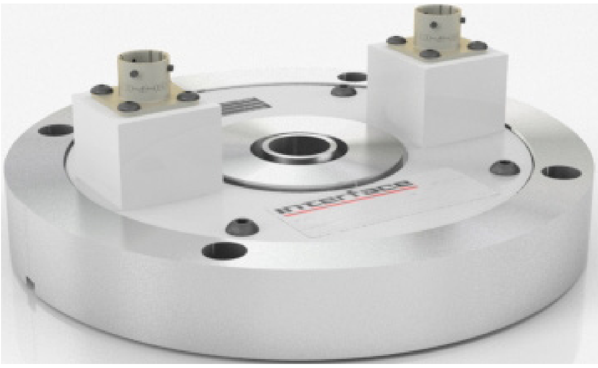
See Drawing	Metric (kN/Nm)	U.S. (lbf/lbf-in)
	10/10	2.25K/88.5
	mm	in
(1)	Ø $97^{+0.2}$	Ø$3.8^{+0.008}$
(2)	Ø $75^{-0.1}$	Ø $3.0^{-0.004}$
(3)	Ø55	Ø2.2
(4)	Ø$50^{-0.1}$	Ø$2.0^{-0.004}$
(5)	94	3.7
(6)	93	3.7
(7)	91.5	3.60
(8)	82	3.23
(9)	65	2.6
(10)	8	0.3
(11)	3	0.1
(12)	Ø95 g6	Ø(3.7197/3.7388)
(13)	Ø $72^{-0.1}$	Ø2.8
(14)	Ø13	Ø0.5
(15)	Ø5.1	Ø0.2
(16)	16	0.6
(17)	13	0.5
(18)	TK Ø$57^{\pm0.1}$	TK Ø$2.2^{\pm0.004}$
(19)	TK Ø$40^{\pm0.1}$	TK Ø$1.6^{\pm0.004}$
(20)	TK Ø$87^{\pm0.1}$	TK Ø$3.4^{\pm0.004}$
(21)	M6	
(22)	M5	
(23)	M4	
(24)	45°	

TXY MULTI-AXIS LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Measures X & Y forces
- Low crosstalk – <1.0%
- Linearity 0.1%
- Mating cable supplied. Right angle plug MS3108E14S-5S.
- 4 Keys supplied

STANDARD CONFIGURATION



Model TXY (Shown)

Specifications

ACCURACY – (MAX ERROR)		
Side Force Capacity	lbf	500
	N	2.22K
Radial Force Capacity	lbf	1K, 1.5K, 2K
	N	4.45K, 6.67K, 89K
Rated Output – mV/V ± %		2 ±0.25
Nonlinearity – %FS		± 0.1
Hysteresis – %FS		± 0.1
Nonrepeatability – %FS		±0.05
TEMPERATURE		
Temperature Effect on Zero – %RO / ºF		±0.002
Temperature Effect of Output – % / ºF		±0.002
Compensated Range	°C	+21.11 to +76.67
	°F	+70 to +170
Operating Range	°C	-53.89 to +93.33
	°F	-65 to +200
ELECTRICAL		
Input Resistance (nominal) – Ω		350
Output Resistance (nominal) – Ω		350
Insulation Resistance (50 VDC) – MΩ		5000
MECHANICAL		
Safe Overload – %CAP		150
Weight	lbs	6.81
	kg	3.1
Material		Alloy Steel

* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

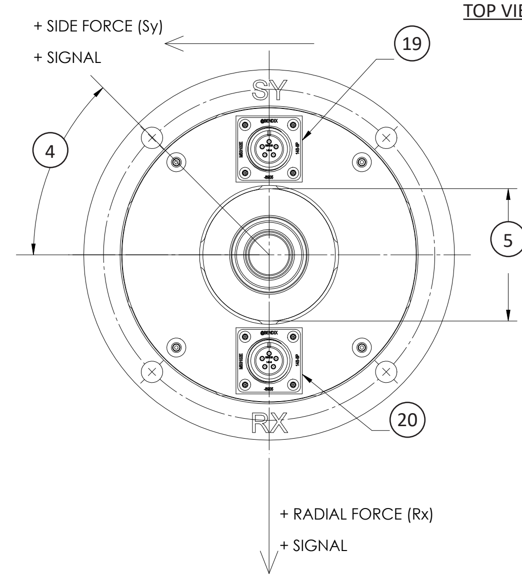
FORCE MEASUREMENT SOLUTIONS.

TXY LOAD CELL (U.S. & METRIC)

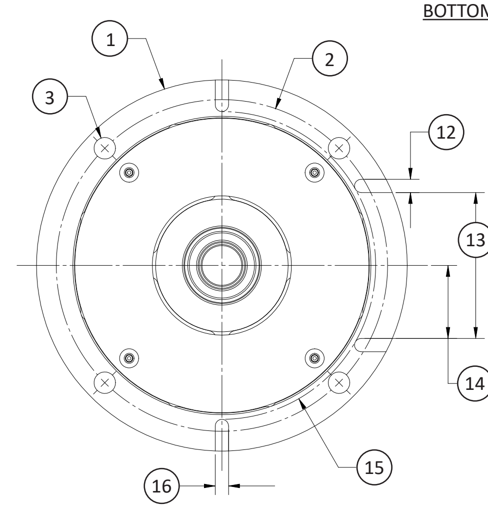
Dimensions

See Drawing	U.S.	Metric
	in	mm
1	Ø7.00	Ø177.8
2	Ø6.25	Ø158.8
3	Ø0.406 THRU 4 Holes EQ SP	Ø10.3124 THRU 4 Holes EQ SP
4	45°	
5	Ø2.50 TYP	63.5
6	2.0	51
7	1.1250 (±0.001)	28.575 (±0.03)
8	0.06	1.5
9	2.65	67.3
10	0.031	0.79
11	Ø(0.7500/0.7495) THRU	Ø(19.050/19.037) THRU
12	0.250 (+0.001/-0.000) TYP	6.35 (+0.03/-0.00) TYP
13	2.750 (±0.001)	69.85 (±0.03)
14	1.375 (±0.0005)	34.93 (±0.0127)
15	r 2.900	r 73.66
16	0.251	6.38
17	0.250 (+0.000/-0.002)	6.35 (+0.000/-0.05)
18	0.50	12.7
19	Sy – Side force	
20	Rx – Radial force	
21	BEARING OFFSET	

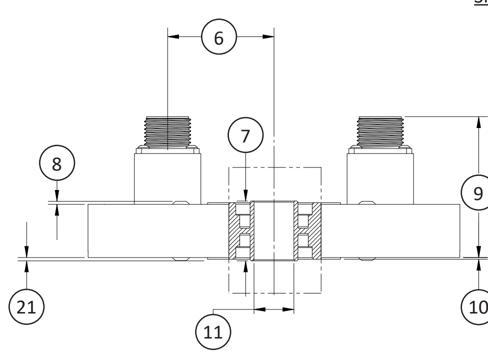
TOP VIEW



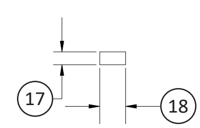
BOTTOM VIEW



SIDE VIEW



KEYS VIEW



* Metric Dimensions and capacities are provided for conversion only. Standard product will be sold in lbf and U.S. Dimensions. Metric capacities available upon special request and at an additional cost.

Notes:

Notes:

Load Pins

Standard

Wireless

WTSLP WIRELESS LOAD PINS (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities range up to 3,000K lbf (13.3K kN)
- Low power consumption for long battery life
- Wireless communication
- 1,969 ft (600 m) range
- Configured and calibrated via PC U.S.ing a base station and telemetry toolkit
- Compatible with Interface WTS Wireless Products
- RobU.S.t, lightweight hoU.S.ing
- Environmentally sealed to IP67

TYPICAL APPLICATIONS

- Crane weighing
- Center of gravity systems
- Vessel weighing
- Platform weighing
- General weighing
- Line Tension

OPTIONS

- Bidirectional loading
- Anti-rotation plate
- Shackles

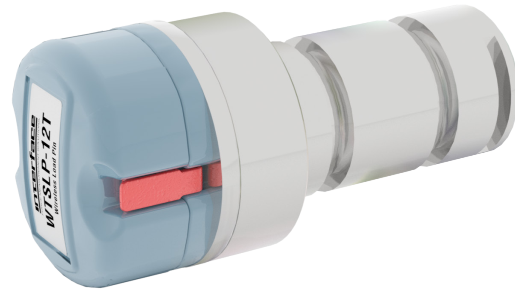
Compatible with wireless hand-held WTS-BS-1

- 8 digit display
- Fully functional tare capability
- Power-off transmitter from receiver enabled
- IP65 waterproof enclosure 3.5 x 5.9 x 1.4 in (90 x 150 x 35 mm)

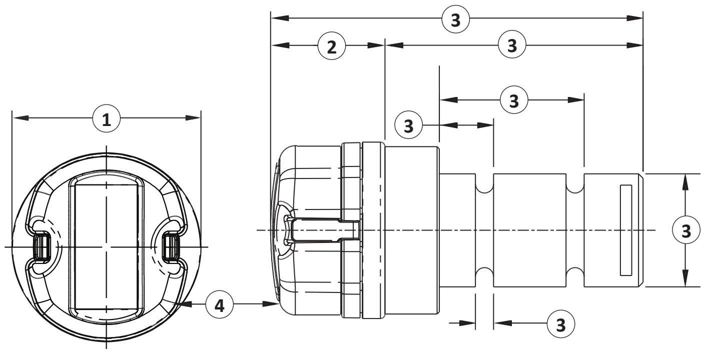
COMPATIBLE WITH

Model WTS-BS-1-HA (Shown)

STANDARD CONFIGURATION



Model WTSLP-12T (Shown)



DIMENSIONS

See Drawing		
	in	mm
(1)	Ø 3.1	Ø 78
(2)	2.0	50.5
(3)	See Load pin Configurator on page 2	
(4)	Battery HoU.S.ing	

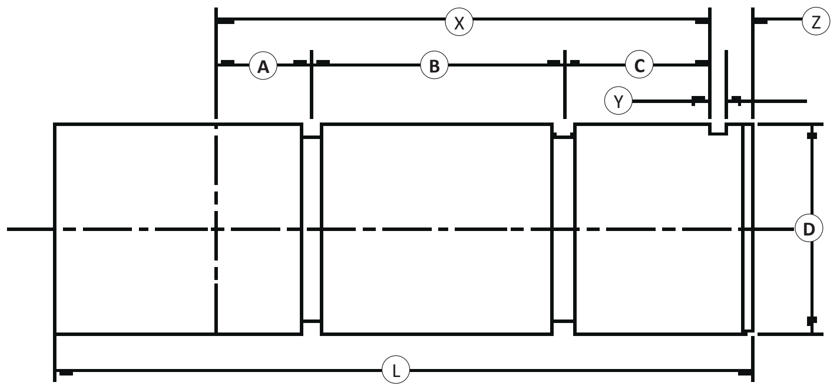
Specifications

Excitation Voltage – VDC		5
Radio Type / Frequency – GHz		2.4; FCC conforming
Transmit Rate – sec		3 / typical
Available Channels		16
Operating Temperature	°F	-4 to +131
	°C	-20 to +55
Battery		2 x AAA Alkaline
Battery Life – hrs		300 typically
Transmission Range – ft (m)		Up to 2,000 (610) (clear line of sight)
Telemetry HoU.S.ing		Polyamide resin
IP Ratng		IP67
Material		Heat Treated Steel or Stainless Steel

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

WTSLP WIRELESS LOAD PINS (U.S. & METRIC)

LOAD PIN CONFIGURATOR



SECTION ONE PHYSICAL DIMENSIONS

Required Dimensions:						**Computed Dimensions:**			
	in	mm		in	mm	**X**	**Y**	**Z**	**L**
A:			**C:**						
B:			**D:**			***estimated - final Dimensions may vary***			

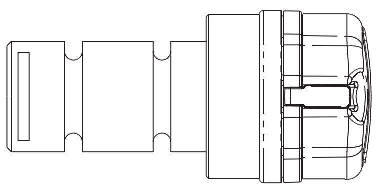
SECTION TWO FEATURES & APPLICATION

Application:					
	1. Static Force / Load		4. Tractor Draw Bar Pull		7. Conveyor Loading
	2. Dynamic Force / Load		5. Mooring Linkage		8. Line Tensiometer
	3. Hoisting Load		6. Fork Lift Loading		9. Other

Capacity:			**Output Signal:**		**ATEX Required:**	
		tonne	mV/V		No	
		K lbf	4-20mA		ATEX"D"	
		kN	0-10V		ATEX"N"	
			RS485		ATEX"I"	

EN 60529 Protection Level:		**Cable Length:**	
	IP65		
	IP66		
	IP67		
	IP68		
	IP69K		

MOUNTING CONFIGURATION



VarioU.S. mounting configurations are available.

Shown: Typical mounting with anti-rotational slot near the end; connector output at hoU.S.ing base.

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

LP LOAD PIN (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities range up to 3,000K lbf (13.3K kN)
- Designed to replace pins or bolts that carry a load
- Stainless steel construction
- U.S.ed with clevises, or pulley shafts to monitor loads
- CU.S.tom designs

IndU.S.try applications:

- Tension / Compression Measurements
- Clevis Pin / Shackle Loading
- Sprockets & Pulley Axle
- Crane, Lifting & Winch System
- Mooring Line Tension Measurements
- Hydraulic Systems

Interface Load Pins are made with a dual-shear design and are designed which for center-loading with support from both ends. Interface load pins are strain gage based, the strain gages are installed in the inside-center, neutral axis of the load pin where they are protected from both physical damage and the environment. A full Wheatstone Bridge ensures the best Specifications, while the physical design ensures proper alignment and anti-rotation of the application.

OPTIONS

- Integral connector
- Amplification (5VDC, 10VDC, 4-20mA)
- Wireless communication
- Bidirectional loading
- Dual bridge
- ATEX Approval
- High Temperature
- Submersible
- TEDS
- Anti-rotation Plate
- Shackles

STANDARD CONFIGURATION

Model 3461EGY-3K (Shown)

Specifications

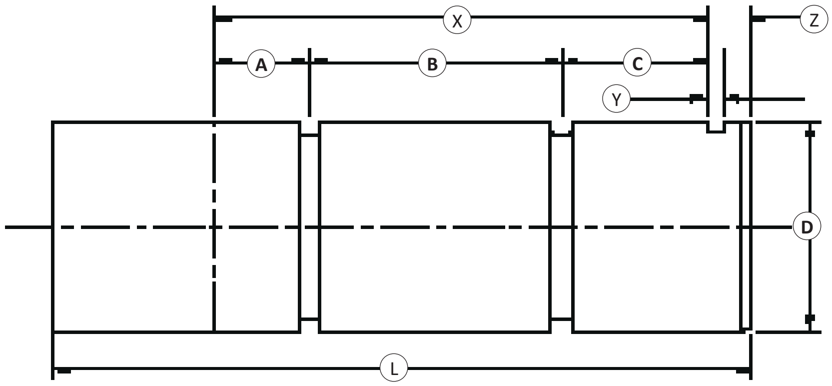
ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		±0.2 to 1.5 (typically) depending on pin geometry
Nonrepeatability – %FS		±0.1
Temperature		
Compensated Range	°F	+14 to +158
	°C	-10 to +70
Operating Range	°F	-4 to +158
	°C	-20 to +70
Zero Temperature Coefficient – % of Rated Load / °C		±0.1
Span Temperature Coefficient – % of Rated Load / °C		±0.1
Electrical		
Rated Output – mV/V (Nominal)		1.5
Zero Balance – %RO		±1
Bridge Resistance – Ohm		350, 1000, 5000
Excitation Voltage – VDC MAX		15.0
Insulation Resistance – Megohm@VDC		500 @ 500
MECHANICAL		
Standard Calibration		Compression
Safe Overload – %Capacity		150
Ultimate Overload – %Capacity		300
Cable Length	ft	16.4
	m	5
Environmental Rating		IP67
Material		Heat Treated Steel or Stainless Steel

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

FORCE MEASUREMENT SOLUTIONS.

LP LOAD PIN (U.S. & METRIC)

LOAD PIN CONFIGURATOR



SECTION ONE PHYSICAL DIMENSIONS

Required Dimensions:						Computed Dimensions:			
	in	mm		in	mm	X	Y	Z	L
A:			C:						
B:			D:			**estimated - final Dimensions may vary*			

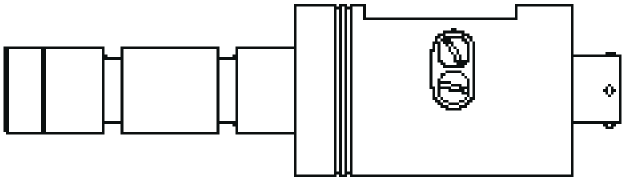
SECTION TWO FEATURES & APPLICATION

Application:					
	1. Static Force / Load		4. Tractor Draw Bar Pull		7. Conveyor Loading
	2. Dynamic Force / Load		5. Mooring Linkage		8. Line Tensiometer
	3. Hoisting Load		6. Fork Lift Loading		9. Other

Capacity:			Output Signal:		ATEX Required:	
		tonne	mV/V		No	
		K lbf	4-20mA		ATEX"D"	
		kN	0-10V		ATEX"N"	
			RS485		ATEX"I"	

EN 60529 Protection Level:		Cable Length:	
	IP65		
	IP66		
	IP67		
	IP68		
	IP69K		

MOUNTING CONFIGURATION



VarioU.S. mounting configurations are available.

Shown: Typical mounting with anti-rotational slot near the end; connector output at hoU.S.ing base.

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Notes:

Tension Links

Standard

Wireless

FORCE MEASUREMENT SOLUTIONS.

WTSTL WIRELESS STAINLESS STEEL TENSION LINK LOAD CELL (U.S. & METRIC)

FEATURES & BENEFITS

- Capacities from 11K to 220K lbf (5 to 100 MT)
- IP67 environmental protection
- Stainless steel construction
- Simple installation and operation
- Transmission range up to 600 meters (1,968.5 ft)
- Long battery life

OPTIONS

- Larger capacities or sizes
- Compatible with other Interface WTS products
- WTS products support multiple load cell solutions
- Can be supplied complete with shackles
- Lockable storage case

STANDARD CONFIGURATION

Model WTSTL-11K (Shown)

COMPATIBLE WITH

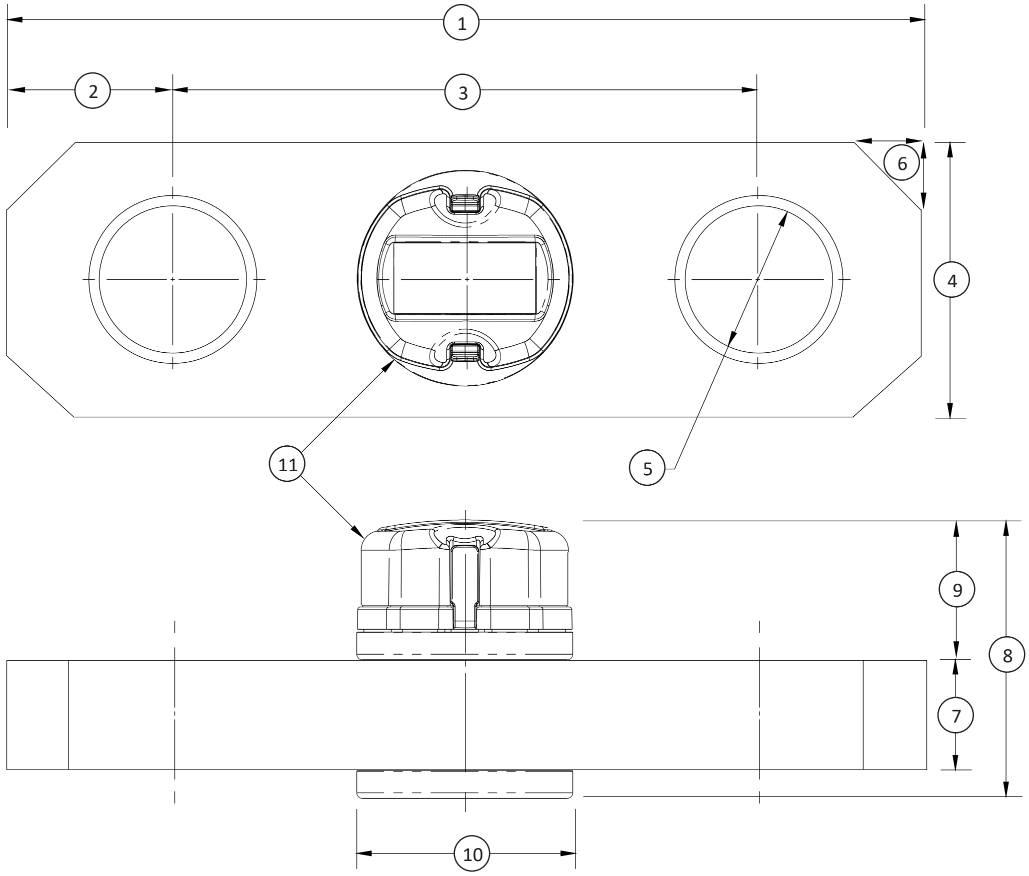
Model WTS-BS-1-HA (Shown)

SPECIFICATIONS

CAPACITY	Metric (mt)	5	12	25	35	50	100
	U.S. (lbf)	11K	26.5K	55.1K	77.1K	110.2K	220.4K
ACCURACY – (MAX ERROR)							
Nonlinearity Error – %FS		±0.15%					
Nonrepeatability – %FS		±0.1%					
TEMPERATURE							
Compensated Range	°C	-10 to +50					
	°F	+14 to +122					
Operating Range	°C	-20 to +55					
	°F	-4 to +131					
Zero Temperature Coefficient – % of Rated Load / °C		±0.01%					
Span Temperature Coefficient – % of Rated Load / °C		±0.01%					
ELECTRICAL							
Excitation Voltage – VDC		5					
Radio Type / Frequency – GHz		2.4; FCC conforming					
Transmit Rate – sec (typically)		3					
Available Channels		16					
Battery Type		2 x AAA Alkaline					
Battery Life – hours (typically)		> 300					
Transmission Range	m	Up to 600 (clear line of sight)					
	ft	Up to 1,968.5 (clear line of sight)					
MECHANICAL							
Standard Calibration		Tension					
Safe Overload – %Capacity		200%					
Ultimate Overload – %Capacity		500%					
Weight	kg	3.0	5.0	9.7	13.0	20.0	43.5
	lbs	6.61	11.02	21.38	28.66	44.09	95.90
Telemetry HoU.S.ing		Polyamide resin					
Load Cell Construction		Stainless steel					
Environmental Rating		IP67					

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in MT and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

WTSTL WIRELESS STAINLESS STEEL TENSION LINK LOAD CELL (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITY											
	Metric (mt)	U.S. (lbf)	Metric (mt)	U.S. (lbf)	Metric (mt)	U.S. (lbf)	Metric (mt)	U.S. (lbf)	Metric (mt)	U.S. (lbf)	Metric (mt)	U.S. (lbf)
	5	**11K**	**12**	**26.5K**	**25**	**55.1K**	**35**	**77.1K**	**50**	**110.2K**	**100**	**220.4K**
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	220	8.7	260	10.2	320	12.6	350	13.8	400	15.7	460	18.1
(2)	32.5	1.3	40	1.6	55	2.2	57.5	2.3	62.5	2.5	91	3.6
(3)	155	6.1	180	7.1	210	8.3	235	9.3	275	10.8	278	10.9
(4)	78	3.1	85	3.3	102	4.0	122	4.8	140	5.5	200	7.9
(5)	Ø27	Ø1.1	Ø37	Ø1.5	Ø53	Ø2.1	Ø52	Ø2.0	Ø59	Ø2.3	Ø84	Ø3.3
(6)	20 x 45°		20 x 45°		25 x 45°		30 x 45°		35 x 45°		50 x 45°	
(7)	22	0.9	32	1.3	43	1.7	42	1.7	50	2.0	68	2.7
(8)	82	3.2	92	3.6	103	4.1	102	4.0	110	4.3	120	4.7
(9)	50	2.0	50	2.0	50	2.0	50	2.0	50	2.0	50	2.0
(10)	78	3.1	78	3.1	78	3.1	78	3.1	78	3.1	78	3.1
(11)	Battery Compartment											

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

FORCE MEASUREMENT SOLUTIONS.

ITL STAINLESS STEEL TENSION LINK LOAD CELL (U.S. & METRIC)

DESCRIPTION

The Interface series ITL Tension Link Load Cell has been designed for lifting and weighing in rugged or harsh environments and is manufactured entirely from stainless steel.

The ITL series products are simple to install and are matched to Standard shackle sizes. ITL series tension link load cells are normally supplied with a MIL specification plug and socket, and are environmentally sealed to IP66.

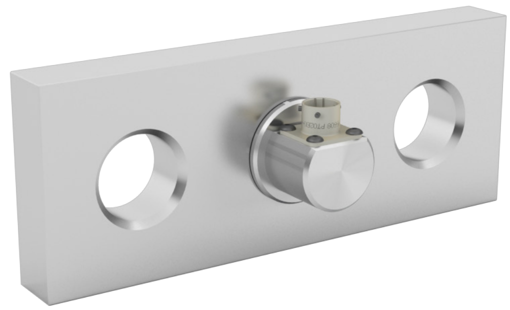
The ITL series can be supplied as shown in this data sheet, or can be modified to meet a particular application requirement. We are always pleased to discU.S.s any special requirements that can be accommodated.

This product can be supplied on its own or combined with our extensive range of instrumentation to provide a complete load monitoring system.

Specifications

Rated Load	mt	5, 10, 20, 25 30, 40, 50, 100
	lbs	11K, 22K, 44.1K, 55K, 66K, 88.2K, 110K, 220K
ACCURACY – (MAX ERROR)		
Accuracy – %FS		< ±0.25
Non-repeatability – %FS		< ±0.04
Temperature		
Compensated Range	°C	-10 to +50
	°F	+14 to +122
Operating Range	°C	-20 to +70
	°F	-4 to +158
Zero Temperature Coefficient – %FS / °C		< ±0.01
Span Temperature Coefficient – %FS / °C		< ±0.01
Electrical		
Output – mV/V at %FS		1.3 at ±10
Bridge Resistance – Ohm		350
Excitation Voltage – VDC MAX		10 recommended, 15 MAX
Insulation Resistance – Megohm @ VDC		> 500 @ 500
MECHANICAL		
Safe Overload – %FS		150
Ultimate Breaking Load – %FS		> 300
Connection Type – Cable	m	5
	ft	16.4
Environmental Protection Level		IP66 (IP67 optional)
Wiring Connections		+ve supply: Red (A) -ve supply: Blue (B) +ve signal: Green (C) -ve signal: Yellow (D)
Material		Stainless steel

STANDARD CONFIGURATION



Model ITL-11K (Shown)

OPTIONS

- Special ranges and sizes available (including high ranges up to 3000K lbf)
- CU.S.tom designs
- Can be supplied complete with shackles
- Can be supplied with integral signal conditioning
- Optional carry kit
- Special Electrical connectors
- ATEX version available

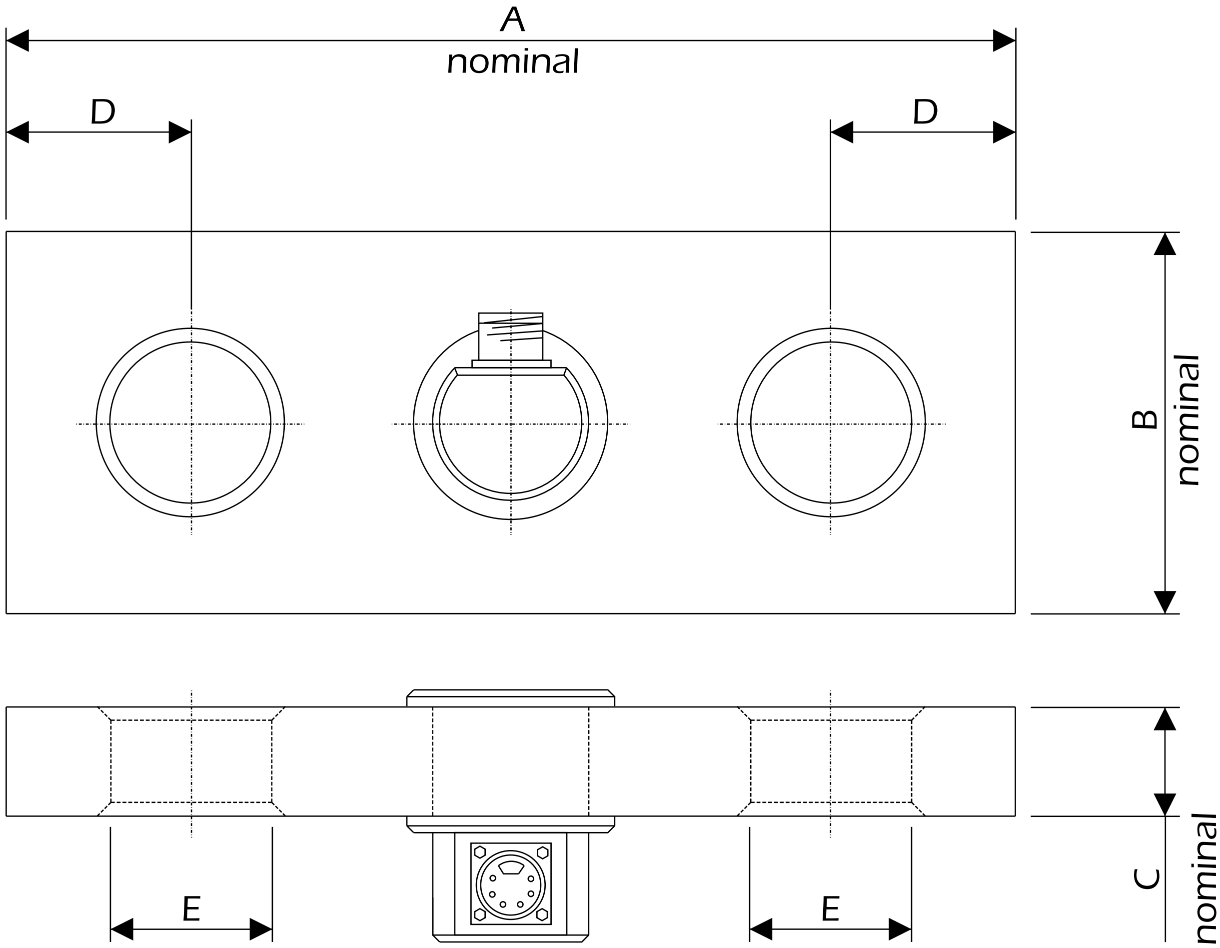
FEATURES AND BENEFITS

- Range: 11K to 220.4K lbf (5 to 100 mt)
- Stainless steel construction (17-4PH)
- Environmentally sealed to IP66 (IP67 available)

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

interface
FORCE MEASUREMENT SOLUTIONS.

ITL STAINLESS STEEL TENSION LINK LOAD CELL (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITY															
	Metric (mt)	U.S. (lbf)	Metric (mt)	U.S. (lbf)	Metric (mt)	U.S. (lbf)	Metric (mt)	U.S. (lbf)	Metric (mt)	U.S. (lbf)	Metric (mt)	U.S. (lbf)	Metric (mt)	U.S. (lbf)	Metric (mt)	U.S. (lbf)
	5	**11K**	**10**	**22K**	**20**	**44.1K**	**25**	**55.1K**	**30**	**66.1K**	**40**	**88.2K**	**50**	**110.2K**	**100**	**220.4K**
	mm	**in**	**mm**	**in**	**mm**	**in**	**mm**	**in**	**mm**	**in**	**mm**	**in**	**mm**	**in**	**mm**	**in**
(A)	230	9.055	260	10.24	330	12.99	330	12.99	370	13.57	420	16.54	430	16.93	480	18.90
(B)	75	2.953	75	2.953	100	3.937	100	3.937	125	4.921	140	5.512	140	5.512	166	6.535
(C)	25	0.984	25	0.984	40	1.575	40	1.575	40	1.575	50	1.968	50	1.968	69	2.717
(D)	37.5	1.476	40	1.575	60	2.362	60	2.362	67.5	2.657	79	3.110	77.5	3.051	101	3.976
(E)	Ø27	Ø1.063	Ø38	Ø1.496	Ø53	Ø2.087	Ø53	Ø2.087	Ø59	Ø2.323	Ø72	Ø2.835	Ø72	Ø2.835	Ø84	Ø3.307
Weight kg	2.5		3		7.5		7.5		12		15		18		37	
Weight lbs	0.098		0.118		0.295		0.295		0.472		0.591		0.709		1.457	

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

Notes:

Load Shackles

Bow Type

'D' Type

Wireless

ATEX BOW TYPE CROSBY™ CABLED LOAD SHACKLE (U.S. & METRIC)

DESCRIPTION

The Interface range of ATEX/IECEx load shackles is designed for lifting and weighing in rugged or harsh environments, and also meet the requirements for operation in Zone 1 and 2 hazardoU.S. areas. The shackle pins are forged from high tensile stainless steel and are machined to an exacting specification. The basic shackle U.S.es the Crosby G2130 (1 to 25MT or 2.2K to 55.1K lbf) and G2140 (40 to 400MT or 88.2K to 882K lbf) series.

This range of ATEX load shackles is proof loaded to 150% of the normal rated load, and is available in a range from 3.25 to 400 MT (7.17K to 882K lbf). The ISHK-A is internally gauged and the whole instrumented area is sealed to IP67 to protect it in service. They are simple to install and are available in Standard shackle sizes. As an option, a rotating bobbin can be supplied to centralize the load and to minimize any point-load effects when the shackle is placed under load.

We are also always happy to discU.S.s any special requirements that can be accommodated.

The ISHK-A ATEX series can be supplied on its own or combined with our extensive range of instrumentation to provide a complete load monitoring package. Larger shackle sizes up to 1500MT (3306K lbf) are also available U.S.ing GN Rope shackles.

TYPICAL APPLICATIONS

- Under-hook hoist/crane weighing
- Cable tension monitoring
- Towing/mooring tension
- Crane safe load monitoring

ISHK-A (Shown)

FEATURES & BENEFITS

- Ranges from 3.25 to 400 MT (7.17K to 882K lbf)
- High tensile carbon steel construction
- Environmentally sealed to IP67
- Simple installation and operation
- Shackle and load pin fully certified
- Optional load centralizing bobbin
- Can be supplied with amplified output
- Many other Options available

OPTIONS

- Special ranges and capacities up to 1.5K MT (3307K lbf)
- Displays and specially packaged electronics availabe on request
- Special Electrical connections
- Integral signal conditioning
- Centralizing load bobbin

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U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

INTERFACE
FORCE MEASUREMENT SOLUTIONS.

ATEX BOW TYPE CROSBY™ CABLED LOAD SHACKLE (U.S. & METRIC)

SPECIFICATIONS

Rated Load	MT	3.25, 4.75, 6.5, 9.5, 12, 17, 25, 40, 55, 85, 120, 200, 300, 400
	lbf	7.17K, 10.5K, 14.3K, 20.9K, 26.5K, 37.5K, 55.1K, 88.2K, 121K, 187K, 265K, 441K, 661K, 882K
Proof Load – %		150 of rated load
Ultimate Breaking Load – %		300 of rated load
Output – mV/V (NOM)		1.5 at rated load
Nonlinearity – %		< ±1.0 of rated load (typically)
Nonrepeatability – %		< ±0.1 of rated load
Excitation Voltage – VDC		10 recommended, 15 maximum
Bridge Resistance – Ω		350
Insulation Resistance – MΩ @ VDC		> 500 @ 500
Operating Temperature Range	°C	-20 to +55
	°F	-4 to +131
Compensated Temperature Range	°C	-10 to +50
	°F	+14 to +122
Zero Temperature Coefficient – % / °C		< ±0.01 of rated load
Span Temperature Coefficient – % / °C		< ±0.01 of rated load
Environmental Protection Level		IP67
Connection Type	m	10, 4-core screened PUR cable (glanded exit)
	ft	32.8, 4-core screened PUR cable (glanded exit)
Wiring Connections		+ve supply: Red, -ve supply: Blue, +ve signal: Green, -ve signal: Yellow
Certification – (°C, °F)		II 2 G EX d IIC T6 Gb IP6X T_{amb} (-20 to +55, -4 to +131) II 2 D Ex tb IIIC T85°C Db IP6X T_{amb} (-20 to +55, -4 to +131)
Certification Numbers		IECEx TRC 14.0011x, TRAC14ATEX0023x

Specifications CONTINUED		CAPACITY															
		Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)
		3.25	**7.17K**	**4.75**	**10.5K**	**6.5**	**14.3K**	**9.5**	**20.9K**	**12**	**26.5K**	**17**	**37.5K**	**25**	**55.1K**	**40**	**88.2K**
Weight	kgs	2.8		3		3.2		5.2		8		12		18		18	
	lbs	6.2		7		7.1		11.5		18		26		40		40	
Resolution	MT	0.005		0.005		0.005		0.01		0.01		0.02		0.02		0.05	
	lbf	11.023		11.023		11.023		22.05		22.05		44.09		44.09		110.23	

Specifications CONTINUED		CAPACITY													
		Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)
		55	**121K**	**85**	**187K**	**120**	**265K**	**150**	**331K**	**200**	**441K**	**300**	**661K**	**400**	**882K**
Weight	kgs	25		45		85		125		215		364		520	
	lbs	55		99		187		276		474		802		1,146	
Resolution	MT	0.05		0.1		0.1		0.1		0.2		0.2		0.5	
	lbf	110.23		220.5		220.5		220.5		440.9		440.9		1102.3	

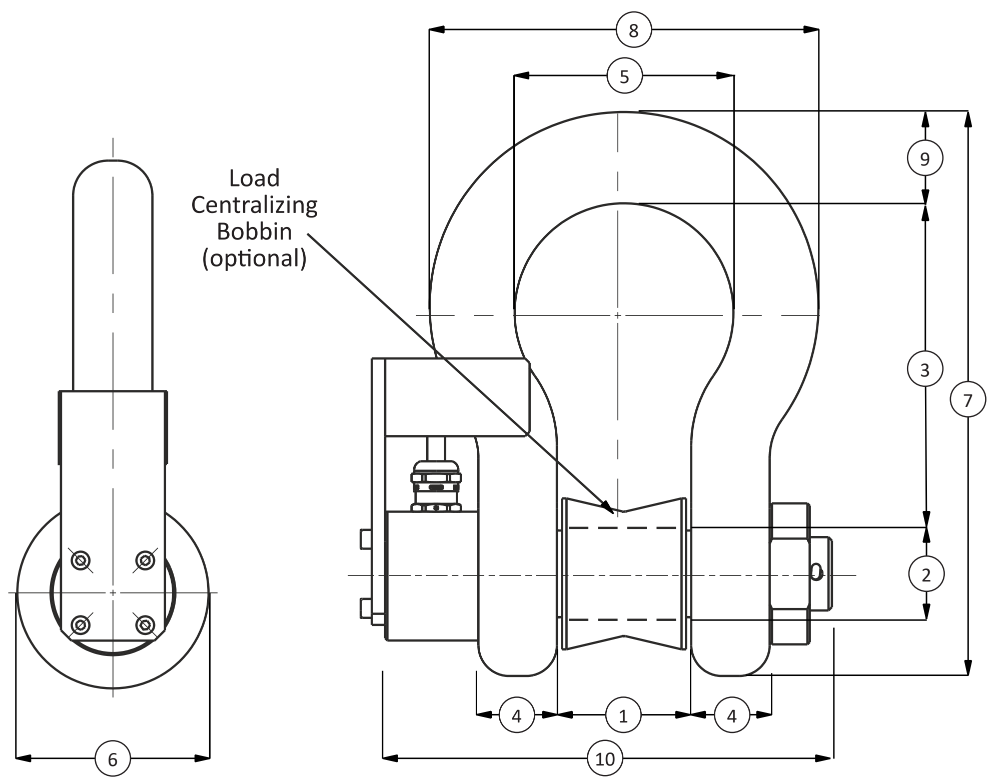
U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

FORCE MEASUREMENT SOLUTIONS

ATEX BOW TYPE CROSBY™ CABLED LOAD SHACKLE (U.S. & METRIC)

SPECIAL OPTIONS

Special Ranges			The ISHK-A can be supplied in any range, between 3.25 and 400 MT (7.17K to 882K lbf) and calibrated as required. U.S.ually we will choose the nearest Standard shackle size. We can also offer special design shackles up to 1.5K MT (3307K lbf). Please contact our sales team for more details.
Special Electrical			The Standard ISHK-A cable exits the shackle pin via a gland and is restrained U.S.ing the anti-rotation bracket. We can offer variations to the Electrical connection method. For example, integral connectors, special cable length etc. For more details contact our office.
Integral Signal Conditioning	Analog Signals	mA (VDC)	4-20 2-wire current output (7.5 to 30 supply)
			4-20 3-wire current output (10 to 30 supply)
		VDC (VDC)	0-5 3-wire voltage output (8.5 to 28 supply)
			0-10 3-wire voltage output (13 to 30 supply)
	Digital Signals	(VDC)	RS232 digital – varioU.S. protocols (5.4 to 18 supply)
			RS485 digital – varioU.S. protocols (5.4 to 18 supply)
Centralizing Bobbin			We can offer an optional centralizing bobbin. This helps improve the overall load cell accuracy in certain cable tension applications. The bobbin is shown pictorially in the drawing below.



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U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

Interface
FORCE MEASUREMENT SOLUTIONS.

ATEX BOW TYPE CROSBY™ CABLED LOAD SHACKLE (U.S. & METRIC)

DIMENSIONS

See Drawing	CAPACITY															
	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)
	3.25	**7.17K**	**4.75**	**10.5K**	**6.5**	**14.3K**	**9.5**	**20.9K**	**12**	**26.5K**	**17**	**37.5K**	**25**	**55.1K**	**40**	**88.2K**
	mm	**in**	**mm**	**in**	**mm**	**in**	**mm**	**in**	**mm**	**in**	**mm**	**in**	**mm**	**in**	**mm**	**in**
(1)	26.9	1.06	31.8	1.25	36.6	1.44	46	1.81	51.5	2.03	60.5	2.38	73	2.9	73	2.9
(2)	19.1	0.75	22.4	0.88	25.4	1.00	31.8	1.25	35.1	1.38	41.4	1.63	51	2.0	51	2.0
(3)	60.5	2.38	71.5	2.81	84	3.31	108	4.25	119	4.7	146	5.7	178	7.0	178	7.0
(4)	16	0.63	19.1	0.75	22.4	0.88	28.7	1.13	31.8	1.25	38.1	1.50	44.5	1.75	44.5	1.75
(5)	42.9	1.69	51	2.01	58	2.28	74	2.91	82.5	3.25	98.5	3.88	127	5.0	127	5.0
(6)	38.1	1.50	46	1.81	53	2.09	68.5	2.70	76	3.0	92	3.6	106	4.2	106	4.2
(7)	106	4.17	126	4.96	148	5.83	190	7.48	210	8.3	254	1.0	313	12.3	313	12.3
(8)	74.5	2.93	89	3.5	102	4.02	131	5.2	146	5.7	175	6.9	225	8.9	225	8.9
(9)	17.5	0.69	20.6	0.81	24.6	0.97	31.8	1.25	35.1	1.38	41.1	1.62	57	2.2	57	2.2
(10)	126.5	4.98	140	5.51	157	6.18	187	7.4	201	7.9	233	9.2	267	10.5	267	10.5

See Drawing	CAPACITY															
	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)
	55	121K	**85**	187K	**120**	265K	**150**	331K	**200**	441K	**300**	661K	**400**	882K
	mm	**in**	**mm**	**in**	**mm**	**in**	**mm**	**in**	**mm**	**in**	**mm**	**in**	**mm**	**in**
(1)	82.5	3.25	105	4.1	127	5.0	133	5.2	184	7.2	213	8.4	210	8.3
(2)	57	2.2	70	2.8	82.5	3.25	95.5	3.76	121	4.8	152	6.0	178	7.0
(3)	197	7.8	267	10.5	330	13.0	372	14.6	397	15.6	495	19.5	572	22.5
(4)	51	2.0	66.5	2.62	76	3.0	95.5	3.76	95.5	3.76	121	4.8	165	6.5
(5)	146	5.7	184	7.2	200	7.9	229	9.0	279	11.0	330	13.0	330	13.0
(6)	122	4.8	145	5.7	165	6.5	203	8.0	267	10.5	305	12.0	356	14.0
(7)	348	13.7	453	17.8	546	21.5	625	24.6	743	29.3	895	35.2	1,022	40.2
(8)	253	10.0	327	12.9	365	14.4	419	16.5	533	21.0	635	25.0	660	26.0
(9)	61	2.4	79	3.1	92	3.6	105	4.1	152	6.0	172	6.8	184	7.2
(10)	284	11.2	364	14.3	439	17.3	503	19.8	541	21.3	638	25.1	728	28.7

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

FORCE MEASUREMENT SOLUTIONS.

ISHK-B BOW TYPE CROSBY™ CABLED LOAD SHACKLE (U.S. & METRIC)

DESCRIPTION

The Interface range of ISHK-B load shackles are designed for lifting and weighing in rugged or harsh environments, including submersible applications. The shackle pins are forged from high tensile stainless steel to 6.5 MT (14.3K lbf) and high tensile carbon steel from 9.5 MT (20.9K lbf), and are machined to an exacting specification. The basic shackle U.S.es the Crosby G2130 (1 to 25 MT / 2205 to 55.1K lbf), G2140 (40 to 120 MT / 88.2K to 265K lbf) and GN Rope H10 (150 to 1K MT / 331K to 2205K lbf).

This range of loads cells are proof loaded to 150% of the normal rated load, and are available in a range from 1 to 1K MT (2205 to 2205K lbf). The integral cable is normally protected by the anti-rotation bracket or by a separate protective plate. The ISHK-B is internally gaged and the whole instrumented area is sealed to IP67 to protect it in service.

They are simple to install and are available in Standard shackle sizes. As an option, a rotating bobbin can be supplied to centralize the load and to minimize any point load effects when the shackle is placed under load. We are also always happy to discU.S.s any special requirements that can be accommodated.

The ISHK-B series can be supplied on its own or combined with our extensive range of instrumentation to provide a complete load monitoring package. A wireless version is also available (see WTSSHK-B for details).

TYPICAL APPLICATIONS

- Under-hook hoist/crane weighing
- Cable tension monitoring
- Towing/mooring tension
- Crane safe load monitoring

ISHK-B (Shown)

FEATURES & BENEFITS

- Ranges from 1 to 1K MT (2205 to 2205K lbf)
- High tensile stainless steel construction (to 6.5 MT / 14.3K lbf) and high tensile carbon steel construction (9.5 MT / 20.9K lbf and above)
- Environmentally sealed to IP67
- Simple installation and operation
- Shackle and pin fully certified

OPTIONS

- Special ranges and capacities up to 2K MT (4409K lbf)
- Special Electrical connections
- Integral signal conditioning
- Centralizing load bobbin
- Subsea, offshore and ROV friendly versions
- TEDS option
- Wireless version available
- 3.2 material certification
- ATEX version available
- Submersible
- Amplified output

Catalog 2019 06-15-2020

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

interface
FORCE MEASUREMENT SOLUTIONS.

ISHK-B BOW TYPE CROSBY™ CABLED LOAD SHACKLE (U.S. & METRIC)

SPECIFICATIONS

Rated Load	MT	1, 2, 3.25, 4.75, 6.5	9.5, 12, 17, 25, 40, 55, 85, 120, 150, 200, 250, 300, 400, 500, 600, 700, 800, 900, 1K
	lbf	2.21K, 4.41K, 7.17K, 10.5K, 14.3K	20.9K, 26.5K, 37.5K, 55.1K, 88.2K, 121K, 187K, 265K, 331K, 441K, 551K, 661K, 882K, 1102K, 1322K, 1543K, 1764K, 1984K, 2205K
Proof Load – %		150 of rated load	
Ultimate Breaking Load – %		300 of rated load	
Output – mV		Between 1.8 and 3.6	
Nonlinearity – %		< ±1 of rated load (typically)	
Nonrepeatability – %		< ±0.1 of rated load	
Excitation Voltage – VDC		10 recommended, 15 maximum	
Bridge Resistance – Ω		350	
Insulation Resistance – MΩ @ VDC		> 500 @ 500	
Operating Temperature Range	°C	-20 to +70	
	°F	-4 to +158	
Compensated Temperature Range	°C	-10 to +50	
	°F	+14 to +122	
Zero Temperature Coefficient – % / °C		< ±0.01 of rated load	
Span Temperature Coefficient – % / °C		< ±0.01 o rated load	
Environmental Protection Level		IP67	
Connection Type	m	10, 4-conductor shielded cable	
	ft	32.8, 4-conductor shielded cable	
Wiring Connections		+ve supply: Red, -ve supply: Blue, +ve signal: Green, -ve signal: Yellow	
Material		Stainless steel	Alloy steel

Specifications CONTINUED		CAPACITY															
		Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)
		1	2.21K	2	4.41K	3.25	7.17K	4.75	10.5K	6.5	14.3K	9.5	20.9K	12	26.5K	17	37.5K
Weight	kgs	2		2.3		2.8		3		3.2		5.2		8		12	
	lbs	4		5.1		6.2		7		7.1		11.5		18		26	
Resolution	MT	0.001		0.002		0.005		0.005		0.005		0.01		0.01		0.02	
	lbf	2.205		4.409		11.023		11.023		11.023		22.05		22.05		44.09	

Specifications CONTINUED		CAPACITY															
		Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)
		25	55.1K	40	88.2K	55	121K	85	187K	120	265K	150	331K	200	441K	250	551K
Weight	kgs	18		18		25		45		85		160		235		285	
	lbs	40		40		55		99		187		353		518		628	
Resolution	MT	0.02		0.05		0.05		0.1		0.1		0.1		0.2		0.2	
	lbf	44.09		110.23		110.23		220.5		220.5		220.5		440.9		440.9	

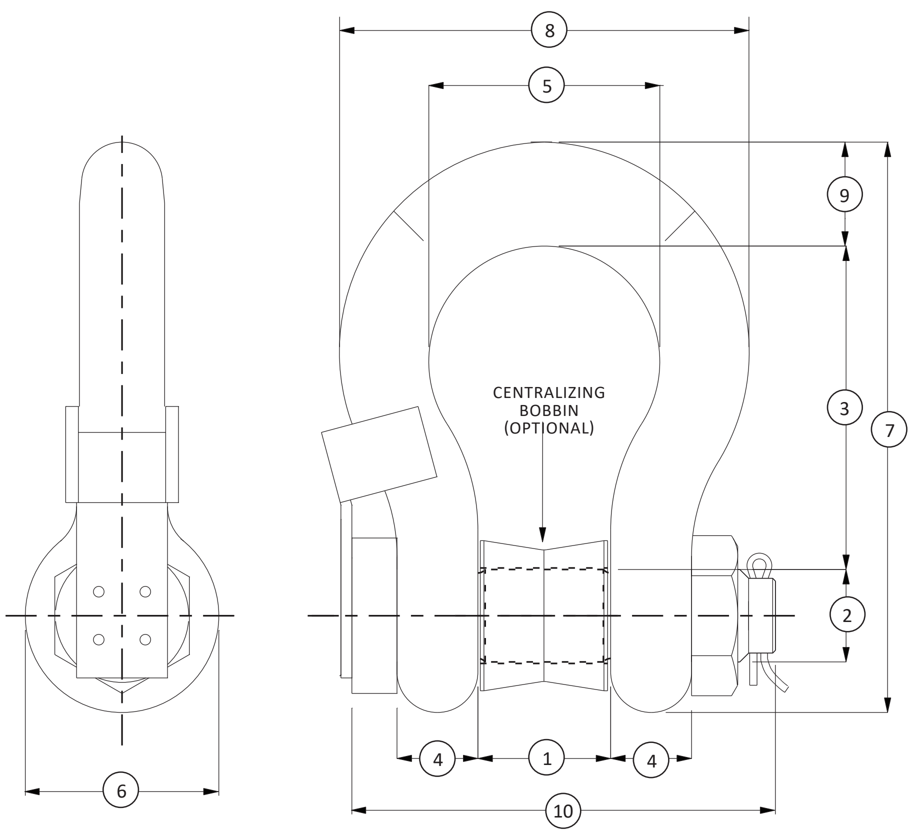
Specifications CONTINUED		CAPACITY															
		Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)
		300	661K	400	882K	500	1102K	600	1322K	700	1543K	800	1764K	900	1984K	1K	2205K
Weight	kgs	340		560		685		880		980		1100		1280		1460	
	lbs	750		1,235		1,510		1,940		2,161		2,425		2,822		3,219	
Resolution	MT	0.5		0.5		0.5		0.5		1		1		1		1	
	lbf	1,102.3		1,102.3		1,102.3		1,102.3		2,205		2,205		2,205		2,205	

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

ISHK-B BOW TYPE CROSBY™ CABLED LOAD SHACKLE (U.S. & METRIC)

SPECIAL OPTIONS

Special Ranges			The ISHK-B can be supplied in any range, between 1 and 1K MT (2205 to 2205K lbf) and calibrated as required. U.S.ually we will choose the nearest Standard shackle size. We can also offer special design shackles up to 2K MT (4409K lbf). Please contact our design team for more details.
Special Electrical			150 of rated load
Integral Signal Conditioning	Analog Signals	mA (VDC)	4-20 2-wire current output (7.5 to 30 supply)
			4-20 3-wire current output (10 to 30 supply)
		VDC (VDC)	0.1-5.1 3-wire voltage output (8.5 to 28 supply)
			0.1-10.1 3-wire voltage output (13 to 30 supply)
	Digital Signals	(VDC)	RS232 digital – varioU.S. protocols (5.4 to 18 supply)
			RS485 digital – varioU.S. protocols (5.4 to 18 supply)
Centralizing Bobbin			We can offer an optional centralizing bobbin. This helps improve the overall load cell accuracy in certain cable tension applications. The bobbin is shown pictorially in the drawing below.
Telemetry			We have a version available that requires no cable connection, U.S.ing radio telemetry to transmit data. There is a separate data sheet available for this product WTSSHK-B.
Subsea or Offshore			We are able to offer fully submersible versions, which are normally supplied with underwater mateable connectors, making them suitable for U.S.e in environmental pressures up to 10,000psi. See below for examples of our submersible load shackles.



U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

interface
FORCE MEASUREMENT SOLUTIONS.

ISHK-B BOW TYPE CROSBY™ CABLED LOAD SHACKLE (U.S. & METRIC)

DIMENSIONS

See Drawing	CAPACITY															
	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)
	1	**2.2K**	**2**	**4.41K**	**3.25**	**7.17K**	**4.75**	**10.5K**	**6.5**	**14.3K**	**9.5**	**20.9K**	**12**	**26.5K**	**17**	**37.5K**
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	16.8	0.66	20.6	0.81	26.9	1.06	31.8	1.25	36.6	1.44	46	1.8	51.5	2.03	60.5	2.38
(2)	Ø11.2	Ø0.44	Ø16	Ø0.6	Ø19.1	Ø0.75	Ø22.4	Ø0.88	Ø25.4	Ø1.00	Ø31.8	Ø1.25	Ø35.1	Ø1.38	Ø41.4	Ø1.63
(3)	36.6	1.44	47.8	1.88	60.5	2.38	71.5	2.81	84	3.3	108	4.3	119	4.7	146	5.7
(4)	9.65	0.380	12.7	0.50	16	0.6	19.1	0.75	22.4	0.88	28.7	1.23	31.8	1.25	38.1	1.50
(5)	26.2	1.03	33.3	1.31	42.9	1.69	51	2.0	58	2.3	74	2.9	82.5	3.25	98.5	3.88
(6)	23.1	0.91	30.2	1.19	38.1	1.50	46	1.8	53	2.1	68.5	2.70	76	3.0	92	3.6
(7)	63	2.5	83.5	3.29	106	4.2	126	5.0	148	5.8	190	7.5	210	8.3	254	10.0
(8)	45.2	1.78	58.5	2.30	74.5	2.93	89	3.5	102	4.0	131	5.2	146	5.7	175	6.9
(9)	Ø9.65	Ø0.380	Ø12.7	Ø0.50	Ø17.5	Ø0.69	Ø20.6	Ø0.81	Ø24.6	Ø0.97	Ø31.8	Ø1.25	Ø35.1	Ø1.38	Ø41.1	Ø1.62
(10)	90	3.5	97	3.8	96	3.8	111	4.4	122	4.8	156	6.1	171	6.7	201	7.9

See Drawing	CAPACITY															
	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)
	25	**55.1K**	**40**	**88.2K**	**55**	**121K**	**85**	**187K**	**120**	**265K**	**150**	**331K**	**200**	**441K**	**250**	**551K**
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	73	2.9	73.2	2.88	82.6	3.25	105	4.1	127	5.0	170	6.7	180	7.1	205	8.1
(2)	Ø51	Ø2.0	Ø50.8	Ø2.0	Ø57.2	Ø2.25	Ø69.9	Ø2.75	Ø82.6	Ø3.3	Ø108	Ø4.3	Ø125	Ø4.9	Ø140	Ø5.5
(3)	178	7.0	178	7.0	197	7.8	267	10.5	330	13.0	400	15.7	500	19.7	540	21.3
(4)	44.5	1.75	44.5	1.75	50.8	2.0	66.5	2.62	76.2	3.00	102	4.0	120	4.7	125	4.9
(5)	127	5.0	127	5.0	146	5.7	184	7.2	200	7.9	275	10.8	290	11.4	305	12.0
(6)	106	4.2	106	4.2	122	4.8	148	5.8	165	6.5	230	9.1	260	10.2	260	10.2
(7)	313	12.3	313	12.3	347	13.7	455	17.9	546	21.5	671	26.4	813	32.0	865	34.0
(8)	225	8.9	224	8.8	258	10.2	324	12.8	371	14.6	479	18.9	530	20.9	555	21.9
(9)	Ø57	Ø2.2	Ø57.2	Ø2.25	Ø61	Ø2.4	Ø79.2	Ø3.12	Ø92.2	Ø3.63	Ø102	Ø4.0	Ø120	Ø4.7	Ø125	Ø4.9
(10)	236	9.3	236	9.3	269	10.6	351	13.8	387	15.2	475	18.7	520	20.5	560	22.0

See Drawing	CAPACITY															
	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)
	300	661K	**400**	882K	**500**	1102K	**600**	1324K	**700**	1543K	**800**	1764K	**900**	1984K	**1K**	2205K
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	205	8.1	230	9.1	255	10.0	285	11.2	310	12.2	310	12.2	330	13.0	350	13.8
(2)	Ø150	Ø5.9	Ø175	Ø6.9	Ø185	Ø7.3	Ø205	Ø8.1	Ø217	Ø8.5	Ø217	Ø8.5	Ø230	Ø9.1	Ø240	Ø9.4
(3)	600	23.6	680	26.8	700	27.6	700	27.6	700	27.6	700	27.6	700	27.6	750	29.5
(4)	130	5.1	165	6.5	180	7.1	195	7.7	205	8.1	210	8.3	220	8.7	230	9.1
(5)	305	12.0	325	12.8	350	13.8	375	14.8	400	15.7	400	15.7	420	16.5	420	16.5
(6)	305	12.0	350	13.8	370	14.6	405	15.9	435	17.1	435	17.1	465	18.3	480	18.9
(7)	958	37.7	1108	43.6	1158	45.6	1200	47.2	1231	48.5	1236	48.7	1268	49.9	1290	50.8
(8)	565	22.4	655	25.8	710	28.0	765	30.1	810	31.9	820	32.3	860	33.9	880	34.6
(9)	Ø130	Ø5.1	Ø165	Ø6.5	Ø180	Ø7.1	Ø195	Ø7.7	Ø205	Ø8.1	Ø210	Ø8.3	Ø220	Ø8.7	Ø230	Ø9.1
(10)	570	22.4	655	25.8	720	28.3	815	32.1	860	33.9	870	34.3	910	35.8	950	37.4

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

ISHK-D 'D' TYPE CROSBY™ CABLED LOAD SHACKLE (U.S. & METRIC)

DESCRIPTION

The Interface range of load shackles is designed for lifting and weighing in rugged or harsh environments. The shackle pins are forged from high tensile alloy steel and are machined to an exacting specification. The basic shackle U.S.es the Crosby G2150 series.

This range of load cells are proof loaded to 150% of the normal rated load, and are available in a range from 1 MT to 35 MT (2.2K to 77.2K lbf). The ISHK-D is internally gaged and the whole instrumented area is sealed to IP67 to protect it in service.

They are simple to install and are available in Standard shackle sizes. As an option, a rotating bobbin can be supplied to centralize the load and to minimize any point-load effects when the shackle is placed under load. We are also always happy to discU.S.s any special requirements that can be accommodated.

The ISHK-D series can be supplied on its own or combined with our extensive range of instrumentation to provide a complete load monitoring package.

ISHK-D (Shown)

TYPICAL APPLICATIONS

- Under-hook hoist/crane weighing
- Cable tension monitoring
- Towing/mooring tension
- Crane safe load monitoring

FEATURES & BENEFITS

- Ranges from 1 to 35 MT (2.2K to 77.2K lbf)
- Environmentally sealed to IP67
- Simple installation and operation
- Shackle and load pin fully certified

OPTIONS

- Special ranges and capacities up to 2K MT (4409K lbf)
- Special Electrical connections
- Integral signal conditioning
- Centralizing load bobbin
- Subsea and offshore versions
- TEDS option
- ATEX version available

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

interface
FORCE MEASUREMENT SOLUTIONS

ISHK-D 'D' TYPE CROSBY™ CABLED LOAD SHACKLE (U.S. & METRIC)

SPECIFICATIONS

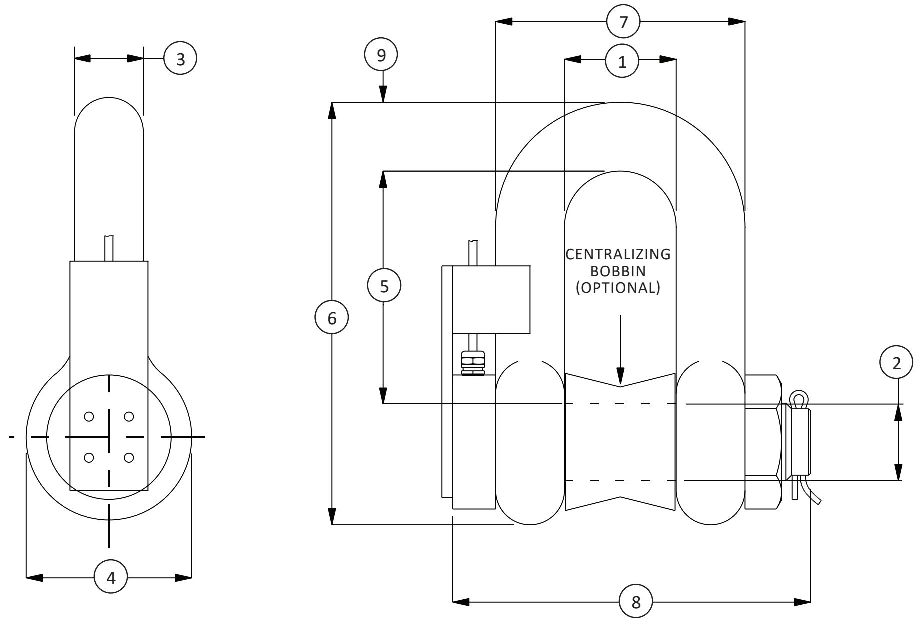
Rated Load (MT)	Metric (MT)	1	2	3.25	4.75	6.5	9.5	12	17	25	35
	U.S. (lbf)	2.2K	4.41K	7.17K	10.5K	14.3K	20.9K	26.5K	37.5K	55.1K	55.1K
Proof Load – %		150 of rated load									
Ultimate Breaking Load – %		300 of rated load									
Output – mV		Between 1.8 and 2.4									
Nonlinearity – %		< ±1 of rated load (typically)									
Nonrepeatability – %		< ±0.1 of rated load									
Excitation Voltage – VDC		10 recommended, 15 maximum									
Bridge Resistance – Ω		350									
Insulation Resistance – MΩ @ VDC		>500 @ 500									
Operating Temperature Range	°C	-20 to +70									
	°F	-4 to +158									
Compensated Temperature Range	°C	-10 to +50									
	°F	+14 to +122									
Zero Temperature Coefficient – % / °C		< ±0.01 of rated load									
Span Temperature Coefficient – % / °C		< ±0.01 of rated load									
Environmental Protection level		IP67									
Connection Type	m	10, 4-conductor shielded cable									
	ft	32.8, 4-conductor shielded cable									
Wiring Connections		+ve supply: Red, -ve supply: Blue, +ve signal: Green, - ve signal: Yellow									
Weight	kgs	2	2.2	2.4	2.8	3.5	6	8	10	15	22
	lbs	4.4	4.85	5.29	6.17	7.72	13.2	17.6	22.0	33.1	48.5
Resolution	MT	0.001	0.002	0.005	0.005	0.005	0.01	0.01	0.02	0.02	0.05
	lbf	2.205	4.409	11.023	11.023	11.023	2.20	2.20	4.41	4.41	11.02
Material		Alloy steel									

SPECIAL OPTIONS

Special Ranges			The ISHK-D can be supplied in any range, between 1 and 35 MT (2.20K to 77.2K lbf) and calibrated as required. U.S.ually we will choose the nearest Standard shackle size. We can also offer special design shackles up to 2K MT (4409K lbf). Please contact our design team for more details
Special Electrical			The Standard ISHK-D cable exits the shackle pin via a gland and is restrained U.S.ing the anti-rotation bracket. We can offer variations to the Electrical connection method. For example, integral connectors, special cable length etc.
Integral Signal Conditioning	Analog Signals	mA (VDC)	4-20 2-wire current output (7.5 to 30 supply)
			4-20 3-wire current output (10 to 30 supply)
		VDC (VDC)	0-5 3-wire voltage output (8.5 to 28 supply)
			0-10 3-wire voltage output (13 to 30 supply)
	Digital Signals	(VDC)	RS232 digital – varioU.S. protocols (5.4 to 18 supply)
			RS485 digital – varioU.S. protocols (5.4 to 18 supply)
Centralizing Bobbin			We can offer an optional centralizing bobbin. This helps improve the overall accuracy in certain cable tension applications. The bobbin is shown pictorially in the Dimensions drawing.
Radio Telemetry			We have a version available that requires no cable connection, U.S.ing radio telemetry to transmit data. There is a separate data sheet available for this product (WTSSHK-D).
Subsea or Offshore			We are able to offer fully submersible versions, which are normally supplied with underwater mateable connectors, making them suitable for U.S.e in environmental pressures up to 10,000psi.

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

ISHK-D 'D' TYPE CROSBY™ CABLED LOAD SHACKLE (U.S. & METRIC)



DIMENSIONS

See Drawing	CAPACITY									
	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)
	1	2.2K	2	4.41K	3.25	7.17K	4.75	10.5K	6.5	14.3K
	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	16.8	0.66	20.6	0.81	26.9	1.06	31.8	1.25	36.6	1.44
(2)	Ø11.2	Ø0.44	Ø16	Ø0.6	Ø19.1	Ø0.75	Ø22.4	Ø0.88	Ø25.4	Ø1.00
(3)	Ø9.65	Ø0.380	Ø12.7	Ø0.50	Ø16	Ø0.6	Ø19.1	Ø0.75	Ø22.4	Ø0.88
(4)	Ø23.1	Ø0.91	Ø30.2	Ø1.19	Ø38.1	Ø1.50	Ø46	Ø1.8	Ø53	Ø2.1
(5)	31	1.2	41.4	1.63	51	2.0	60.5	2.38	71.5	2.81
(6)	58.5	2.30	77	3.0	95.5	3.76	115	4.5	135	5.3
(7)	35.8	1.41	46	1.8	58.5	2.30	70	2.8	81	3.2
(8)	55	2.2	84	3.3	89.5	3.52	103	4.1	120	4.7
(9)	9.65	0.380	12.7	0.50	16	0.6	20.6	0.81	24.6	0.97

See Drawing	CAPACITY									
	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)
	9.5	20.9K	12	26.5K	17	37.5K	25	55.1K	35	77.2K
	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	46.0	1.81	51.5	2.03	60.5	2.38	73.0	2.87	82.5	3.25
(2)	Ø31.8	Ø1.25	Ø35.1	Ø1.38	Ø41.4	Ø1.63	Ø51	Ø2.0	Ø57	Ø2.2
(3)	Ø28.7	Ø1.13	Ø31.8	Ø1.25	Ø38.1	Ø1.50	Ø44.5	Ø1.75	Ø51	Ø2.0
(4)	Ø68.5	Ø2.70	Ø76	Ø3.0	Ø92	Ø3.6	Ø106	Ø4.2	Ø122	Ø4.8
(5)	91	3.6	100	3.9	122	4.8	146	5.7	172	6.8
(6)	172	6.8	191	7.5	230	9.1	279	11.0	312	12.3
(7)	103	4.1	115	4.5	137	5.4	162	6.4	184	7.2
(8)	150	5.9	165	6.5	196	7.7	230	9.1	264	10.4
(9)	31.8	1.25	35.1	1.38	41.1	1.62	54	2.1	60	2.4

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

FORCE MEASUREMENT SOLUTIONS.

WTSSHK-B WIRELESS CROSBY™ BOW LOAD SHACKLE (U.S. & SHACKLE)

DESCRIPTION

The WTSSHK-B range of telemetry load shackles are manufactured U.S.ing the Crosby™ G2130 (12 to 15 MT / 26.5K and 33.1K lbf) and G2140 (40 to 120 MT / 88.2K to 265K lbf) shackles. Suitable for U.S.e in a wide range of indU.S.trial and marine weighing applications, these load shackles are robU.S.t, reliable and easy to install.

The unique telemetry hoU.S.ing is manufactured from tough high performance polyamide resin making it strong yet light, resulting in a better balanced load shackle when compared to others available on the market. Two clips enable you to open the hoU.S.ing to access and change the batteries, while the internal electronics underneath remain completely sealed. This includes the antenna to ensure maximum protection from damage. The built in radio telemetry electronics operates on the 2.4GHz license free frequency.

The WTSSHK-B can be supplied as Standard with a handheld battery powered display which can toggle between MT or lbs, or alternatively, for multi-shackle applications. A single display can address up to 12 shackles for individual monitoring, or for summation/ weighing applications.

Interface can also supply more complex telemetry systems. For further information on what we can offer, please contact our technical department with details of your application requirements.

WTS-BS-1-HA with WTSSHK-B (Shown)

FEATURES & BENEFITS

- Ranges from 12 to 120 MT (26.5K and 265K lbf)
- Environmentally sealed to IP67
- Simple installation and operation
- Shackle and load pin fully certified

TYPICAL APPLICATIONS

- Under-hook hoist/crane weighing
- Cable tension monitoring
- Towing/mooring tension
- Crane safe load monitoring
- Beam proof loading

OPTIONS

- Special ranges and capacities up to 2K MT (4409K lbf)
- Centralizing load bobbin
- Special telemetry systems available

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

WTSSHK-B WIRELESS CROSBY™ BOW LOAD SHACKLE (U.S. & SHACKLE)

SPECIFICATIONS

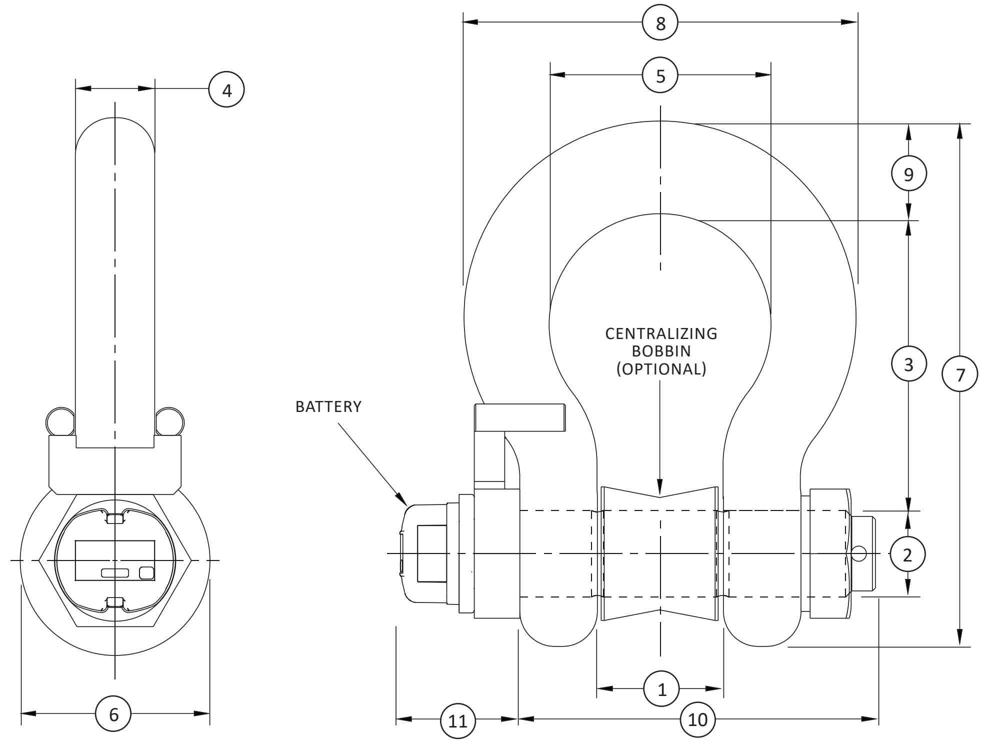
Rated Load	Metric (MT)	12	17	25	40	55	85	120
	U.S. (lbf)	26.5K	37.5K	55.1K	88.2K	121K	187K	265K
Proof Load – %		150 of rated load						
Ultimate Breaking Load – %		300 of rated load						
Nonlinearity – %		< ±1 of rated load (typically)						
Nonrepeatability – %		< ±0.1 of rated load						
Transmission Distance	m	Up to 610 (clear line of sight)						
	ft	Up to 2,000 (clear line of sight)						
Battery Life		>300 hours typically (continuoU.S. U.S.e with 1.2Ah batteries)						
Battery		2 x AAA Alkaline (supplied with 1.2Ah batteries)						
Operating Temperature Range	°C	-20 to +55						
	°F	-4 to +131						
Environmental Protection Level		IP67						
Weight	kg	8	12	18	18	25	45	85
	lbs	17.6	26.5	39.7	39.7	55.1	99.2	187
Resolution	MT	0.01	0.02	0.02	0.05	0.05	0.1	0.1
	lbf	22.046	44.092	44.092	110.231	110.231	220.46	220.46
Telemetry HoU.S.ing		Polyamide resin						
Material		Alloy steel						

SPECIAL OPTIONS

Special Ranges	The WTSSHK-B can be supplied in any range, between 12 and 120 MT (26.5K and 265K lbf) and calibrated as required. U.S.ually we will choose the nearest Standard shackle size. We can also offer special design shackles up to 2K MT (4,409K lbf). Please contact our sales team for more details.
Centralizing Bobbin	We can offer an optional centralizing bobbin. This helps improve the overall load cell accuracy in certain cable tensions applications. The bobbin is shown pictorially in the drawing below.
Multi-Shackle Systems	It is possible with the Standard handheld telemetry display to U.S.e up to 12 shackles with a single handheld. Each shackle is paired with the handheld and can be U.S.ed to view individual load cells or summated load cells. These values can be sent to a printer or a PC.

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

WTSSHK-B WIRELESS CROSBY™ BOW LOAD SHACKLE (U.S. & SHACKLE)



DIMENSIONS

See Drawing	CAPACITY													
	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)
	12	26.5K	17	37.5K	25	55.1K	40	88.2K	55	121K	85	187K	120	265K
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
1	51.5	2.03	60.5	2.38	73	2.9	73.2	2.9	82.6	3.3	105	4.1	127	5.0
2	Ø35.1	Ø1.38	Ø41.4	Ø1.63	Ø51	Ø2.0	Ø50.8	Ø2.0	Ø57.2	Ø2.25	Ø69.9	Ø2.75	Ø82.6	Ø3.25
3	119	4.7	146	5.7	178	7.0	178	7.0	197	7.8	267	10.5	330	13.0
4	31.8	1.25	38.1	1.50	44.5	1.75	46.7	1.74	52.8	2.08	68.8	2.71	79.2	3.12
5	82.5	3.2	98.5	3.88	127	5.0	127	5.0	146	5.7	184	7.2	200	7.9
6	Ø76	Ø3	Ø92	Ø3.6	Ø106	Ø4.2	Ø106	Ø4.2	Ø122	Ø4.8	Ø148	Ø5.8	Ø165	Ø6.5
7	210	8.3	254	10.0	313	12.3	313	12.3	347	13.7	455	17.9	546	21.5
8	146	5.7	175	6.9	225	8.9	224	8.8	258	10.2	324	12.8	371	14.6
9	Ø35.1	Ø1.38	Ø41.4	Ø1.63	Ø51	Ø2.0	Ø50.8	Ø2.0	Ø57.2	Ø2.25	Ø69.9	Ø2.75	Ø82.6	Ø3.25
10	171	6.7	201	7.9	236	9.3	236	9.3	269	10.6	351	13.8	387	15.2
11	79	3.1	79	3.1	79	3.1	79	3.1	79	3.1	79	3.1	79	3.1

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

WTSSHK-B-HL WIRELESS BOW LOAD SHACKLE (U.S. & METRIC)

DESCRIPTION

The WTSSHK-B-HL range of telemetry load shackles are manufactured U.S.ing the GN rope H10 shackle. Suitable for U.S.e in a wide range of indU.S.trial and marine heavy lift weighing applications, these load shackles provide a robU.S.t and effective method of measuring large tensile loads. They are particularly suited to offshore applications, as they include 3.1 material certification as Standard and the proof load test.

The unique telemetry hoU.S.ing is manufactured from tough high performance polyamide resin making it strong yet light, resulting in a better balanced load shackle when compared to others available on the market. Two clips enable you to open the hoU.S.ing to access and change the batteries, while the internal electronics underneath remain completely sealed. This includes the antenna to ensure maximum protection from damage. The built in radio telemetry electronics operates on the 2.4GHz license free frequency.

The WTSSHK-B can also supply as Standard with a handheld battery powered display which can toggle between MT or lbs, or alternatively, for multi-shackle applications, a single display can address up to 12 shackles for individual monitoring, or for summation/weighing applications.

Interface can also supply more complex telemetry systems. For further information on what we can offer, please contact our technical department with details of your application requirements.

WTS-BS-1-HA with WTSSHK-B-HL (Shown)

FEATURES & BENEFITS

- Ranges from 120 to 1K MT (265K to 2205K lbf)
- Environmentally sealed to IP67
- Simple installation and operation
- Shackle and load pin fully certified

SPECIAL OPTIONS

Special Ranges	The WTSSHK-B-HL can be supplied in any load rating, between 120 and 2K MT (265K to 4409K lbf)and calibrated as required. U.S.ually we will choose the nearest Standard shackle size. We can also offer special design shackles up to 2K MT. Please contact our design team for more details.
Centralizing Bobbin	We can offer an optional centralizing bobbin. This helps improve the overall load cell accuracy in certain cable tension applications. The bobbin is shown pictorially in the drawing below.
Multi-Shackle Systems	It is possible with the Standard handheld telemetry display to U.S.e up to 12 shackles with a single handheld. Each shackle is paired with the handheld and can be U.S.ed to view individual load cells or summated load cells. These values can be sent to a printer or a PC.

TYPICAL APPLICATIONS

- Towing/mooring tension
- Winch load monitoring
- Water bag testing

OPTIONS

- Special ranges and capacities up to 2K MT (4409K lbf)
- Centralizing load bobbin
- Special telemetry systems available

Catalog 2019 06-15-2020

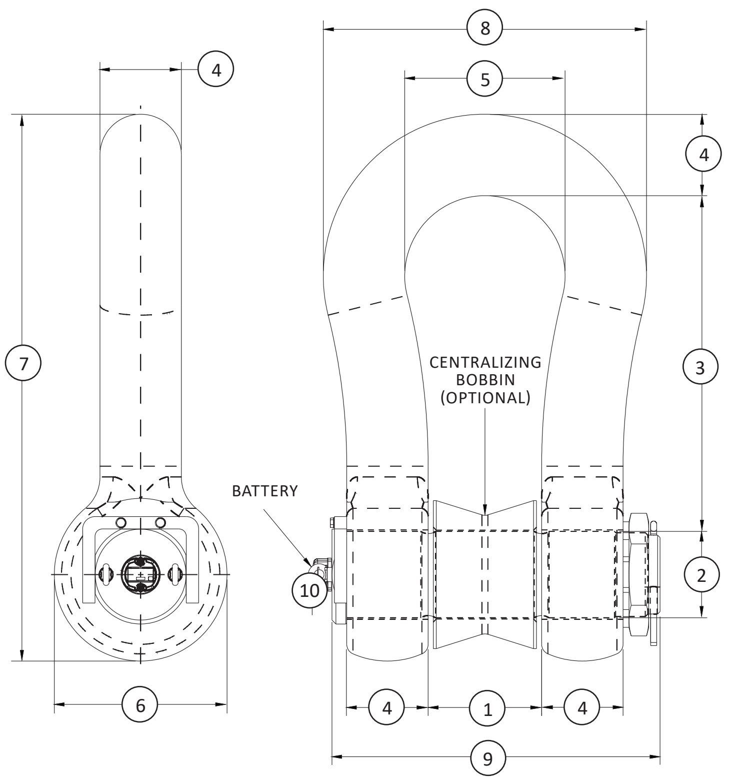
U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

Interface
FORCE MEASUREMENT SOLUTIONS.

WTSSHK-B-HL WIRELESS BOW LOAD SHACKLE (U.S. & METRIC)

SPECIFICATIONS

Rated Load	Metric (MT)	120	150	200	250	300	400	500	600	700	800	900	1000
	U.S. (lbf)	265K	331K	441K	551K	661K	882K	1102K	1324K	1543K	1764K	1984K	2205K
Proof Load – %		150 of rated load											
Ultimate Breaking Load – %		300 of rated load											
Nonlinearity – %		< ±1 of rated load (typically)											
Nonrepeatability – %		< ±0.1 of rated load											
TransmissionDistance	m	Up to 610 (clear line of sight)											
	ft	Up to 2,000 (clear line of sight)											
Battery Life		>300 hours typically (continuoU.S. U.S.e with 1.2Ah batteries)											
Battery		2 x AAA Alkaline (supplied with 1.2Ah batteries)											
Operating Temperature Range	°C	-20 to +55											
	°F	-4 to +131											
Weight	kgs	110	160	235	285	340	560	685	880	980	1100	1280	1460
	lbs	242.5	352.7	518.1	628.3	749.6	1234.6	1510.2	1940.1	2160.5	2425.1	2821.9	3218.7
Resolution	MT	0.1	0.1	0.2	0.2	0.5	0.5	0.5	0.5	1	1	1	1
	lbf	220	220	441	441	1.1K	1.1K	1102	1102	2205	2205	2205	2205
Environmental Protection Level		IP67											
Telemetry HoU.S.ing		Polyamide resin											
Material		Alloy steel											



U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

WTSSHK-B-HL WIRELESS BOW LOAD SHACKLE (U.S. & METRIC)

DIMENSIONS

See Drawing	CAPACITY											
	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)
	120	265K	150	331K	200	441K	250	551K	300	661K	400	882K
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	150	5.9	170	6.7	180	7.1	205	8.1	205	8.1	230	9.1
(2)	Ø95	Ø3.7	Ø108	Ø4.3	Ø125	Ø4.9	Ø140	Ø5.5	Ø150	Ø5.9	Ø175	Ø6.9
(3)	380	15.0	400	15.7	500	19.7	540	21.3	600	23.6	680	26.8
(4)	89	3.5	102	4.0	120	4.7	125	4.9	130	5.1	165	6.5
(5)	238	9.4	275	10.8	290	11.4	305	12.0	305	12.0	325	12.8
(6)	Ø200	Ø7.9	Ø230	Ø9.1	Ø260	Ø10.2	Ø260	Ø10.2	Ø305	Ø12.0	Ø350	Ø13.8
(7)	617	24.3	671	26.4	813	32.0	865	34.1	958	37.7	1,108	43.6
(8)	416	16.4	479	18.9	530	20.9	555	21.9	565	22.2	655	25.8
(9)	420	16.5	475	18.7	520	20.5	560	22.0	570	22.4	655	25.8
(10)	40	1.6	40	1.6	40	1.6	40	1.6	40	1.6	40	1.6

See Drawing	CAPACITY											
	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)
	500	1102K	600	1324K	700	1543K	800	1764K	900	1984K	1K	2205K
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
(1)	255	10.0	285	11.2	310	12.2	310	12.2	330	13.0	350	13.8
(2)	Ø185	Ø7.3	Ø205	Ø8.1	Ø217	Ø8.5	Ø217	Ø8.5	Ø230	Ø9.1	Ø240	Ø9.4
(3)	700	27.6	700	27.6	700	27.6	700	27.6	700	27.8	750	29.5
(4)	180	7.1	195	7.7	205	8.1	210	8.3	220	8.7	230	90.1
(5)	350	13.8	375	14.8	400	15.7	400	15.7	420	16.5	420	16.5
(6)	Ø370	Ø14.6	Ø405	Ø15.9	Ø435	Ø17.1	Ø435	Ø17.1	Ø465	Ø18.3	Ø480	Ø18.9
(7)	1158	45.6	1,200	47.2	1,231	48.5	1,236	48.7	1,268	49.9	1,290	50.8
(8)	710	28.0	765	30.1	810	31.9	820	32.3	860	33.9	880	34.6
(9)	720	28.3	815	32.1	860	33.9	870	34.3	910	35.8	950	37.4
(10)	40	1.6	40	1.6	40	1.6	40	1.6	40	1.6	40	1.6

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

WTSSHK-B-JR WIRELESS CROSBY™ BOW LOAD SHACKLE (U.S. & METRIC)

DESCRIPTION

The WTSSHK-B-JR range of telemetry load shackles are manufactured U.S.ing the Crosby™ G2130 shackle. Suitable for U.S.e in a wide range of lower capacity indU.S.trial weighing applications, these load shackles are accurate, reliable and simple to install. They are particularly popular in theatrical applications for measuring the loads on rigging, hoists and stage lifts.

The IP67 rated telemetry hoU.S.ing is manufactured from ABS plastic making it strong yet light, and the telemetry hoU.S.ing is manufactured from ABS plastic making it strong yet light, and the telemetry electronics contained within are powered by two AA batteries. The unit also Features an internal antenna for maximum protection from damage.

The WTSSHK-B-JR can also be supplied with a handheld battery powered display which can toggle between MT or lbs, or alternatively, for multi-shackle applications. A single display can address up to 12 shackles for individual monitoring, or for summation/weighing applications.

Interface can also supply more complex telemetry systems. For further information on what we can offer, please contact our technical department with details of your application requirements.

WTS-BS-1-HA with WTSSHK-B-JR (Shown)

FEATURES & BENEFITS

- Ranges from 3.25 to 9.5 MT (7.17K to 20.9K lbf)
- Environmentally sealed to IP67
- Simple installation and operation
- Shackle and load pin fully certified

TYPICAL APPLICATIONS

- Rigging/hoist monitoring
- Vessel weighing
- Cable tension monitoring
- Lift/stage weighing/monitoring
- Vehicle testing

OPTIONS

- Special ranges and capacities
- Integral signal conditioning
- Special telemetry systems available
- Longer battery life with different transmission rate settings (1 update per second extends battery life to 2000 hours)
- Multiple load cell systems
- Tablet PC option with data logging and other cU.S.tomized Features
- Centralizing bobbin
- Amplified output option

SPECIFICATIONS

Rated Load	MT	3.25	4.75	6.5	9.5
	lbf	7.17K	10.5K	14.3K	20.9K
Proof Load – %		150 of rated load			
Ultimate Breaking Load – %		500 of rated load			
Nonlinearity – %		< ±1 of rated load (typically)			
Nonrepeatability – %		< ±0.1 of rated load			
Transmission Distance	m	Up to 600 (clear line of sight)			
	ft	Up to 1968.5 (clear line of sight)			
Battery Life		>650 hours (continuoU.S. U.S.e, with 2.3Ah batteries)			
Battery		AA Alkaline x 2			
Operating Temperature Range	°C	-20 to +55			
	°F	-4 to +131			
Environmental Protection Level		IP67			
Telemetry HoU.S.ing		ABS plastic			
Weight	kgs	0.62	1.23	1.79	3.75
	lbf	1.37	2.71	3.95	8.27
Resolution	MT	0.01	0.01	0.01	0.01
	lbf	22.0	22.0	22.0	22.0
Material – Load Pin		Stainless steel			

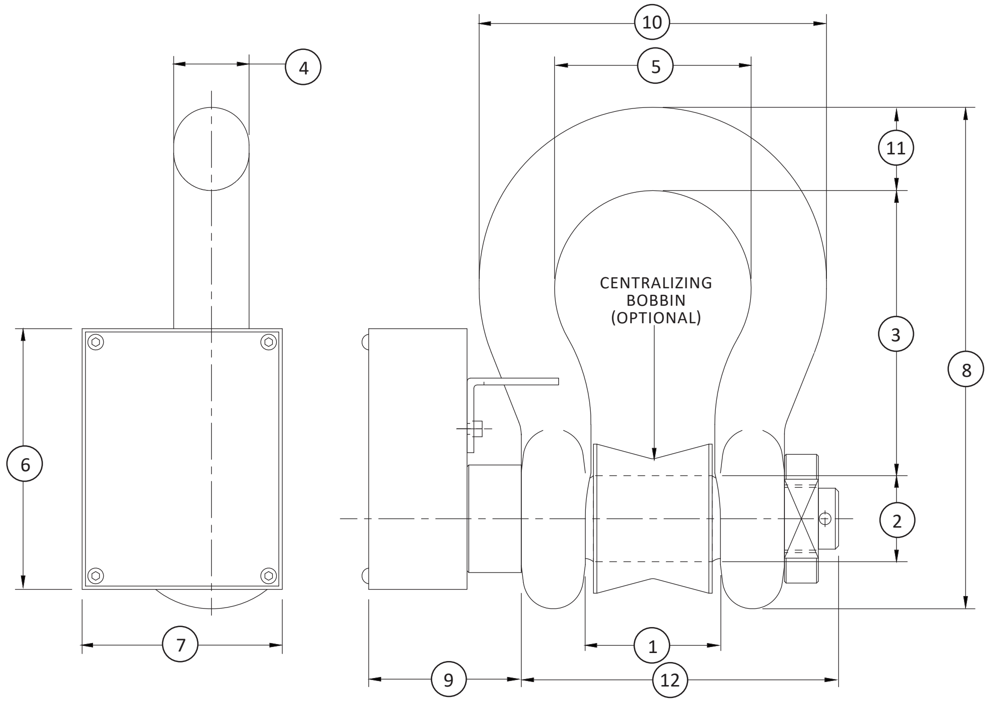
U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

FORCE MEASUREMENT SOLUTIONS.

WTSSHK-B-JR WIRELESS CROSBY™ BOW LOAD SHACKLE (U.S. & METRIC)

SPECIAL OPTIONS

Special Ranges	The WTSSHK-B-JR can be supplied in any range, between 3.25 and 9.5 MT (7.17K and 20.9K lbf) calibrated as required. U.S.ually we will choose the nearest Standard shackle size.
Multi-Shackle Systems	It is possible with the Standard handheld telemetry display to U.S.e up to 12 shackles with a single handheld. Each shackle is paired with the handheld and can be U.S.ed to view individual load cells or summated load cells. These values can be sent to a printer or a PC.



DIMENSIONS

See Drawing	CAPACITY							
	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)
	3.25	**7.17K**	**4.75**	**10.5K**	**6.5**	**14.3K**	**9.5**	**20.9K**
	mm	in	**mm**	in	**mm**	in	**mm**	in
(1)	27	1.0	31.8	1.25	36.6	1.44	46	1.8
(2)	Ø19.1	Ø0.75	Ø22.4	Ø0.89	Ø25.4	Ø1.00	Ø31.8	Ø1.25
(3)	60.5	2.38	71.5	2.81	84	3.3	108	4.3
(4)	16	0.6	19.1	0.75	22.4	0.89	28.9	1.14
(5)	42.9	1.69	51	2.0	58	2.3	74	2.9
(6)	77	3.0	77	3.0	77	3.0	59	2.3
(7)	59	2.3	59	2.3	59	2.3	77	3.0
(8)	106	4.2	126	5.0	148	5.8	190	7.5
(9)	41	1.6	41	1.6	45	1.8	54	2.1
(10)	74.6	2.94	89	3.5	102	4.0	131	5.2
(11)	17.5	0.69	20.6	0.81	24.6	0.97	31.8	1.3
(12)	73	2.9	83	3.3	94	3.7	119	4.7

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

FORCE MEASUREMENT SOLUTIONS.

WTSSHK-D WIRELESS CROSBY™ LOAD SHACKLE (U.S. & METRIC)

DESCRIPTION

The WTSSHK-D range of telemetry load shackles are manufactured U.S.ing the Crosby™ G2150 shackles. Versions are also available U.S.ing the popular GreenPin™ range of shackles. The built in radio telemetry electronics operates on the 2.4GHz license free frequency.

The unique telemetry hoU.S.ing is manufactured from tough high performance polyamide resin making it strong yet light, resulting in a better balanced load shackle when compared to others available on the market. Two clips enable you to open the hoU.S.ing to access and change the two AAA batteries, while the internal electronics underneath remain completely sealed. This includes the antenna to ensure maximum protection from damage.

The WTSSHK-D can also be supplied with a handheld battery powered display which can toggle between MT or lbs, or alternatively, for multi-shackle applications. A single display can address up to 12 shackles for individual monitoring, or for summation/weighing applications.

Interface can also supply more complex telemetry systems. For further information on what we can offer, please contact our technical department with details of your application requirements.

WTS-BS-1-HA with WTSSHK-D (Shown)

FEATURES & BENEFITS

- Ranges from 12 to 35 MT (26.5K to 77.2K lbf)
- Environmentally sealed to IP67
- Simple installation and operation
- Shackle and load pin fully certified

TYPICAL APPLICATIONS

- Under-hook hoist/crane weighing
- Cable tension monitoring
- Towing/mooring tension
- Crane safe load monitoring
- Beam proof loading

OPTIONS

- Special ranges available
- Integral signal conditioning
- Centralizing load bobbin
- Special telemetry systems available
- Amplified output option

SPECIFICATIONS

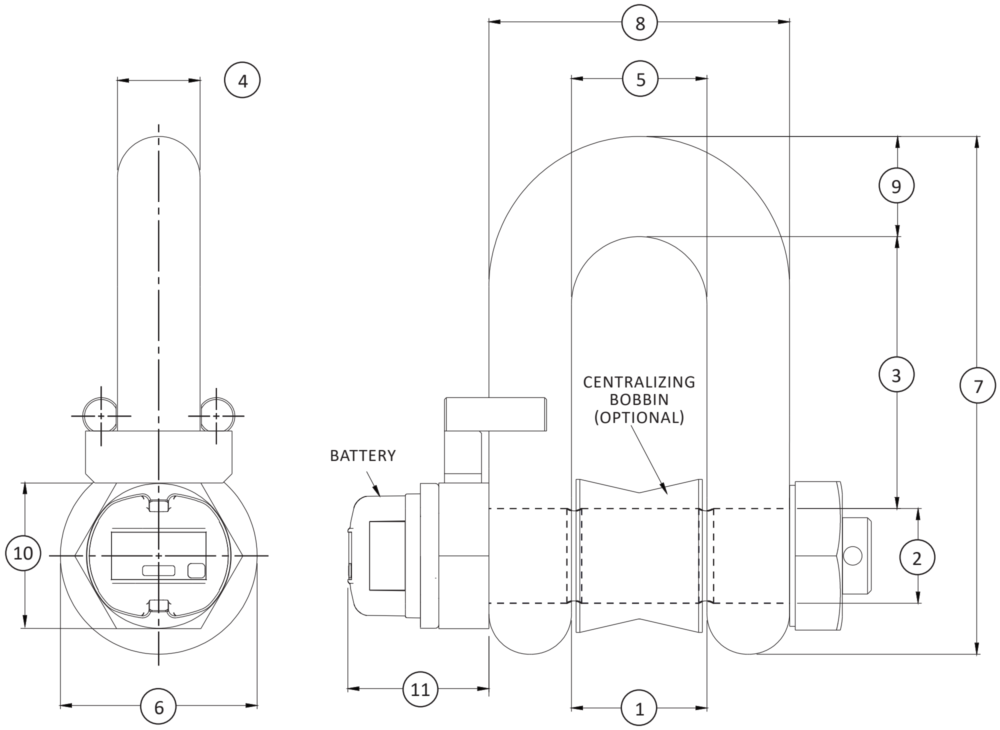
Rated Load	MT	12	17	25	35
	lbf	26.5K	37.5K	55.1K	77.2K
Proof Load – %		150 of rated load			
Ultimate Breaking Load – %		300 of rated load			
Nonlinearity – %		< ±1 of rated load (typically)			
Nonrepeatability – %		< ±0.1 of rated load			
Transmission Distance	m	Up to 600 (clear line of sight)			
	ft	Up to 1968.5 (clear line of sight)			
Battery Life		>300 hours (continuoU.S. U.S.e, with 1.2Ah batteries)			
Battery		AAA Alkaline x 2 (supplied with 1.2Ah batteries)			
Operating Temperature Range	°C	-20 to +55			
	°F	-4 to +131			
Environmental Protection Level		IP67			
Telemetry HoU.S.ing		Polyamide resin			
Weight	kgs	6.5	11	17	23
	lbs	14.3	24.3	37.5	50.7
Resolution	MT	0.01	0.02	0.02	0.05
	lbf	22.0	44.1	44.1	110
Material		Alloy steel			

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

WTSSHK-D WIRELESS CROSBY™ LOAD SHACKLE (U.S. & METRIC)

SPECIAL OPTIONS

Special Ranges	The WTSSHK-D can be supplied in any range, between 12 and 35 MT (26.5K and 77.2K lbf) and calibrated as required. U.S.ually we will choose the nearest Standard shackle size. We can also offer special design shackles up to 2K MT (4409K lbf). Please contact our design team for more details
Centralizing Bobbin	We can offer an optional centralizing bobbin. This helps improve the overall accuracy in certain cable tension applications. The bobbin is shown pictorially in the drawing below.
Multi-Shackle Systems	It is possible with the Standard handheld telemetry display to U.S.e up to 12 shackles with a single handheld. Each shackle is paired with the handheld and can be U.S.ed to view individual load cells or summated load cells. These values can be sent to a printer or a PC.



DIMENSIONS

See Drawing	CAPACITY							
	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)	Metric (MT)	U.S. (lbf)
	mm	in	mm	in	mm	in	mm	in
	12	26.5K	17	37.5K	25	55.1K	35	77.2K
(1)	51.5	2.03	60.5	2.38	73	2.9	82.5	3.25
(2)	Ø35.1	Ø1.38	Ø41.4	Ø1.63	Ø51	Ø2.0	Ø57	Ø2.2
(3)	100	3.94	122	4.8	146	5.7	172	6.8
(4)	31.8	1.25	38.1	1.50	44.5	1.75	51	2.0
(5)	51.5	2.03	60.5	2.38	73	2.9	82.5	3.25
(6)	Ø76	Ø3.0	Ø92	Ø3.6	Ø106	Ø4.2	Ø122	Ø4.8
(7)	191	7.5	230	9.1	279	11.0	312	12.3
(8)	115	4.5	137	5.4	162	6.4	184	7.2
(9)	35.1	1.38	41.1	1.62	54	2.1	60	2.4
(10)	Ø78	Ø3.1	Ø78	Ø3.1	Ø78	Ø3.1	Ø78	Ø3.1
(11)	76	3.0	76	3.0	76	3.0	76	3.0

U.S. Dimensions and capacities are provided for conversion only. Standard product will be sold in kN and Metric Dimensions. U.S. capacities available upon special request and at an additional cost.

Notes:

Notes:

Instrumentation

Digital Indicators

Signal Conditioners

Digital Output Indicators

Analog Indicators

U.S.B Interface Modules

Data Acquisition

Junction Boxes

Acquisition Modules

Wireless

Repeater Modules

ModbU.S.

LED Displays

Remote Data Collection

4 CHANNEL 9840-400-1-T INTELLIGENT INDICATOR

FEATURES & BENEFITS

- TEDS Plug & Play Ready! IEE1451.4 compliant
- 4 channel
- Remote sense excitation
- 5 & 6 point linearization
- Bipolar
- ±999,999 display counts
- Nonlinearity < ±0.005%
- Auto setup for multiple load cells
- Fast, direct analog output
- ±10 VDC scalable analog output – 16 bit
- U.S.B 2.0 serial communication
- Peak/valley hold with front panel reset
- Front panel and remote tare
- 8 selectable digital filters
- Auto zero
- Front panel shunt calibration with two selectable resistors
- Display units conversion: Lb, Kg, N, Psi, Mpa, Klb, KN, t, mV/V, lb-in, oz-in, Nm
- (2) Interactive 7" graphical touch screen displays
- Quadrature encoder channel available
- mV/V calibration
- Compatible with Gold Standard® Calibration Systems

POWER OPTIONS

- 9840-400-1-T 115 VAC
- 9840-400-2-T 230 VAC

OPTIONS

- Up to three additional 16-bit scalable analog outputs
- Display Freeze/Remote Display Freeze
- 4-20 mA analog output
- Quad Limits
- RS485
- Multi-drop RS232
- 7-pin circular load cell connector
- Encoder Channel
- Keylock
- High level input channel

STANDARD CONFIGURATION

MODEL 9840-400-1-T (Shown)

SPECIFICATIONS

EXCITATION		
Voltage – VDC		5 or 10
Current – MAX – mA		180
OUTPUTS		
Serial Interface		U.S.B 2.0
Output – Analog, 16 bit – VDC		Scalable, ±10
Output – Analog, Direct – Hz		1.5K BW
Output – Analog – mA		4–20 (optional)
Limits		Quad-programmable
PERFORMANCE		
Maximum Display Counts		±999,999
Display Update / sec.		15 Hz
Internal Resolution – bits		24
Signal Input Range – mV/V		±4.5
Programmable Count – by		1, 2, 5, 10, and 20
Conversion Rate / sec.		60
Maximum Error – %FS		0.01 ±1 count
CMRR – dB		115
ENVIRONMENTAL		
Operating Temperature	°F	+32 to +122
	°C	0 to +50
Storage Temperature	°F	+14 to +140
	°C	-10 to +60
Relative Humidity – % MAX	°F	95 (104) non-condensing
	°C	95 (40) non-condensing
POWER		
AC Power – VAC, Hz		115 or 230, 50–60
DC Power (option)		Available as a special
Power Consumption – watts		120VAC, 2A; 230VAC, 1A
MECHANICAL		
Dimensions – W x H x D	in	17 x 5.25 x 10 (19 w/L-Brackets)
	mm	431.8 x 133.35 x 254 (482.6 w/L-Brackets)
Weight	lbs	9
	kg	4.08233
Display		(2) Interactive 7" graphical touch screen displays
Unit Annunciator		Lb, Kg, Klb, kN, N, mV/V, lbf-in, oz-in, Nm

9890 STRAIN GAGE, LOAD CELL, & mV/V INDICATOR

FEATURES & BENEFITS

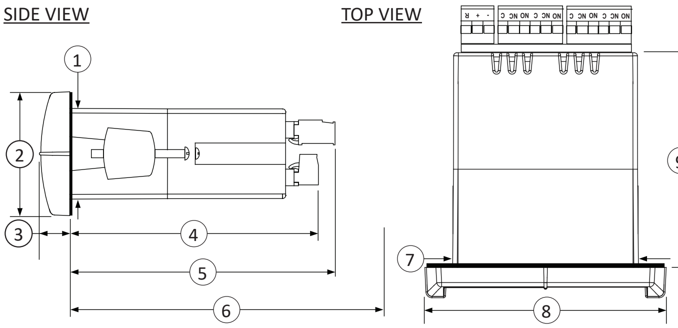
- Large Dual-Line 6-Digit Display, 0.60" & 0.46"
- 0.03% Accuracy
- Peak and valley monitoring
- 24-bit resolution
- U.S.B Port with programming and viewing software
- Powers up to 12 x 350 ohm Sensors
- 32-point linearization
- ±15, ±25, ±150, ±250 mV Bipolar Input Ranges

OPTIONS

- 12-24 VDC Power
- 4-20mA Analog Output
- Internal relays (2 or 4)
- Sunbright display for outdoor U.S.e
- RS232 & RS485 serial communication
- Additional external relay module
- Digital I/O expansion module
- Scalable Analog Output 4-20mA

ACCESSORIES

- NEMA 4X Bench Top Enclosure
- Plexiglas bench top tilt stand



DIMENSIONS

See Drawing	1	2	3	4	5	6	7	8	9
in	1.76	2.45	0.59	4.77	5.05	6	3.61	4.68	4.17
mm	44.5	62	15	121	128	152	91.5	119	106

Notes:
1. *Panel cutout required: 1.772" x 3.622" (45 mm x 92 mm)*
2. *Panel thickness: 0.040 - 0.250" (1.0 mm - 6.4 mm)*
3. *Mounting brackets lock in place for easy mounting*
4. *Clearance: Allow 6" (152 mm) behind the panel*

STANDARD CONFIGURATION

MODEL 9890 (Shown)

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		+/-0.03
PERFORMANCE		
Maximum Display Counts		6 digits (-99999 to 999,999)
Display Update/sec		5
Internal Resolution – bit		24
Signal Input Range	Unipolar	15, 30, 150, 300 mV
	Bipolar	±15, ±25, ±150, ±250 mV
Normal Mode Rejection – dB		>60 at 50/60Hz
Readings Per Second		5
Excitation – VDC		5, 10
ENVIRONMENTAL		
Operating Temperature	°F	-40 to 149
	°C	-40 to 65
Relative Humidity – %		0 to 90
POWER		
AC – VAC		85-265
AC – Hz		50/60
Power Consumption – w		20 max
MECHANICAL		
Dimensions – W x H x D	in	4.68 x 2.45 x 5.63
	mm	119 x 62 x 143
Weight	oz	9.5
	kg	0.27
Display	in	0.60 & 0.46
	mm	15.24 & 11.68
Panel Cutout – mm	in	3.62 x 1.77
	mm	92 x 45 (1/8 DIN)

9894 ANALOG INPUT PROCESS INDICATOR

FEATURES & BENEFITS

- 0-20 mA, 4-20 mA, 0-5 V, 1-5 V, and ±10 V Inputs
- 0.03% Accuracy
- Peak and valley monitoring
- 24-bit resolution
- U.S.B Port with programming and viewing software
- Large Dual-Line 6-Digit Display, 0.60" & 0.46"
- 32-point linearization

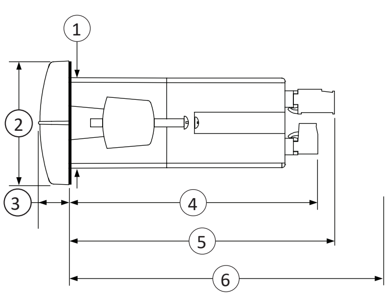
OPTIONS

- 12-24 VDC Power
- 4-20mA Analog Output
- Internal relays (2 or 4)
- Sunbright display for outdoor U.S.e
- RS232 & RS485 serial communication
- Additional external relay module
- Digital I/O expansion module
- ModbU.S. RTU serial communications
- Scalable Analog Output 4-20mA

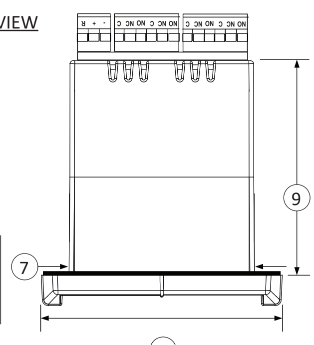
ACCESSORIES

- NEMA 4X Bench Top Enclosure
- Plexiglas bench top tilt stand

SIDE VIEW



TOP VIEW



DIMENSIONS

See Drawing	1	2	3	4	5	6	7	8	9
in	1.76	2.45	0.59	4.77	5.05	6	3.61	4.68	4.17
mm	44.5	62	15	121	128	152	91.5	119	106

Notes:
1. *Panel cutout required: 1.772" x 3.622" (45 mm x 92 mm)*
2. *Panel thickness: 0.040 - 0.250" (1.0 mm - 6.4 mm)*
3. *Mounting brackets lock in place for easy mounting*
4. *Clearance: Allow 6" (152 mm) behind the panel*

STANDARD CONFIGURATION

MODEL 9894 (Shown)

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		+/-0.03
PERFORMANCE		
Maximum Display Counts		6 digits (-99999 to 999,999)
Display Update/sec		5
Internal Resolution – bit		24
Signal Input Range		0-20 mA, 4-20 mA, 0-5 V, 1-5 V, and ±10 V
Normal Mode Rejection – dB		>60 at 50/60Hz
Readings Per Second		5
Excitation – VDC		5, 10
ENVIRONMENTAL		
Operating Temperature	°F	-40 to 149
	°C	-40 to 65
Relative Humidity – %		0 to 90
POWER		
AC – VAC		85-265
AC – Hz		50/60
Power Consumption – w		20 max
MECHANICAL		
Dimensions – W x H x D	in	4.68 x 2.45 x 5.63
	mm	119 x 62 x 143
Weight	oz	9.5
	kg	0.27
Display	in	0.60 & 0.46
	mm	15.24 & 11.68
Panel Cutout – mm	in	3.62 x 1.77
	mm	92 x 45 (1/8 DIN)

06-15-2020
Catalog 2019

FORCE MEASUREMENT SOLUTIONS.

480 BIDIRECTIONAL DIGITAL WEIGHT INDICATOR

FEATURES & BENEFITS

- Large 0.8 in LED 6-digit display
- 100,000 displayed graduations
- ±523,000 internal counts
- Powers up to 10 load cells
- Tension/Compression operation
- NEMA 4X stainless steel enclosure
- Measurement rate up to 40/sec
- 0.1uV/graduation signal sensitivity

SPECIFICATIONS

ELECTRICAL		
Excitation Voltage – VDC		5, 10 x 350Ω load cells or 20 x 700Ω load cells
Current – mA @ VAC		70 @115 35 @ 230
PERFORMANCE		
Maximum Display Counts		±99999
Internal Resolution Counts		±523,000
Analog Input Range – mV/V		±5
Readings Per Second		up to 40 selectable
Nonlinearity – % FS		0.01
Sensitivity – uV		to 0.1/graduation min
ENVIRONMENTAL		
Operating Temperature	°C	-10 to +50
	°F	+14 to +122
Enclosure		NEMA 4X/IP66 stainless steel washdown
POWER		
AC Power	VAC	115 - 230
	Hz	50 or 60
MECHANICAL		
Dimensions - W x H x D	mm	241.3 x 152.4 x 69.85
	in	9.5 x 6 x 2.75
Weight	kg	2.9
	lbs	6.4
Display		6 digit LED
Material		Stainless Steel Enclosure

OPTIONS

- Analog output – 16-bit, 0-10V, 0-20mA, 4-20mA
- I/O Board – 4 digital outputs (dry contact, 2A)
  – 2 digital inputs (up to 24 VDC)
- Setpoints – 8 with batching (I/O Board option required)

CE

FORCE MEASUREMENT SOLUTIONS.

920i PROGRAMMABLE WEIGHT INDICATOR/CONTROLLER (U.S. & METRIC)

FEATURES & BENEFITS

- LCD display, (W x H) 4.6 in x 3.4 in
- Selectable character sizes from 0.25 in to 1.2 in
- 60 configurable operator prompts
- Display up to four scale channels per screen with required Legal for Trade information
- 32 scale accumulators
- Five softkeys with 10 U.S.er-defined, 14 preset functions per screen
- Ten programmable display screens
- Millivolt calibration, 5-point linearization and geographical calibration
- NEMA Type 4X/IP66 stainless steel enclosure
- Selectable A/D measurement rate up to 960/second
- 100 setpoints, 30 configurable setpoint types
- Two slots for option cards
- 1,000-ID truck register for in/out weighing
- 64 K U.S.er on-board NV RAM
- U.S.er programmable 128 K flash memory
- Reflash memory to upgrade firmware
- Power for 16, 350 ohms load cells per A/D board
- Local-remote indicators
- Multi range/interval
- Audit trail tracking
- Peak hold
- Rate of change

OPTIONS

- Provides streaming ASCII for print, remote display and logging
- Inernal mV/V calibration
- U.S.B Interface
- Analog Output: 0-10V and 0-20mA
- Digital I/O, 24-Channel TTL Output
- Ethernet

STANDARD CONFIGURATION

Model 920i (Shown)

CE

interface
FORCE MEASUREMENT SOLUTIONS.

920i PROGRAMMABLE WEIGHT INDICATOR/CONTROLLER (U.S. & METRIC)

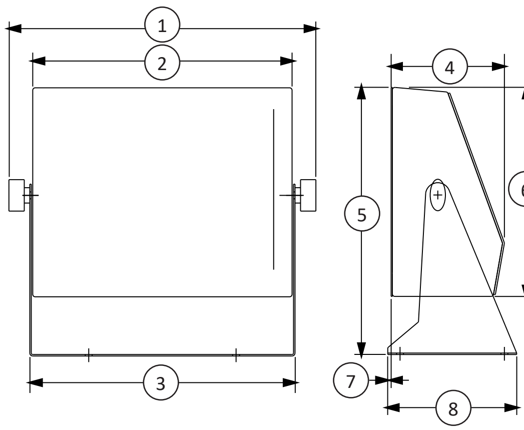
SPECIFICATIONS

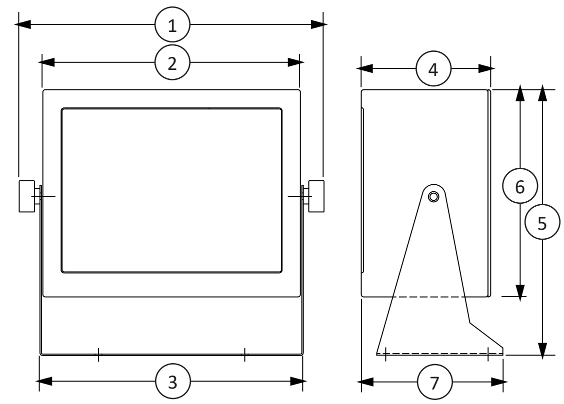
ELECTRICAL		
Excitation Voltage – VDC		10 ± 8x350Ω or 16x700Ω load cells per A/D card
Analog Signal Input Range – mV/V		-45 to +45
Analog Signal Sensitivity – µV/GRAD – Hz		0.3 minimum at 7.5 1.0 recommended
A/D Sample Rate – Hz		7.5 to 960, software selectable
PERFORMANCE		
Maximum Display		+9999999
Internal Resolution – counts		8 million
Nonlinearity – %FS		0.01% full scale
Digital I/O		Six I/O channels on CPU board; optional 24-channel I/O expansion boards available
Communication Ports – mA	Four ports on CPU board support up to 115,200 bps	
	Port 1	Full duplex RS-232
	Port 2	RS-232 with CTS/RTS; PS/2 keyboard interface via DB-9 connector
	Port 3	Full duplex RS-232, 20 output
	Port 4	Full duplex RS-232, 2-wire RS-485, 20 output
	Optional dual-channel serial expansion boards available	
	Channel A	RS-232, RS-485, 20
	Channel B	RS-232, 20
ENVIRONMENTAL		
Certified Temperature	°F	+14 to +104
	°C	-10 to +40
Operating Temperature	°F	+14 to +122
	°C	-10 to +50

POWER			
AC Voltages – VAC, Hz			100-240, Frequency: 50-60
DC Voltages – VDC			12-24
Consumption – W		AC	25 universal, 65 panel & wall mount
		DC	25
MECHANICAL			
Dimensions – W x H x D		mm	90 x 152 x 34
		in	3.5 x 6.0 x 1.3
Weight	Universal Enclosure	kg	4.3
		lbs	9.5
	Wall Mount Enclosure	kg	10.4
		lbs	23.0
	Panel Mount Enclosure	kg	3.9
		lbs	8.5
	Deep Universal	kg	5.0
		lbs	11.0
Display – mm (in)			(W x H) 4.6 in x 3.4 in (116 mm x 86 mm), 320 x 240 pixel LCD module with adjU.S.table contrast Transmissive display Transflective display (optional)
Keys/Buttons			27-key membrane panel, tactile feel, PS/2 port for external keyboard connection
EMC Immunity			EN 50082 Part 2 IEC EN 61000-4-2, 3, 4, 5, 6, 8, and 11
Rating			NEMA Type 4X/IP66
Material			Stainless steel

920i PROGRAMMABLE WEIGHT INDICATOR/CONTROLLER (U.S. & METRIC)

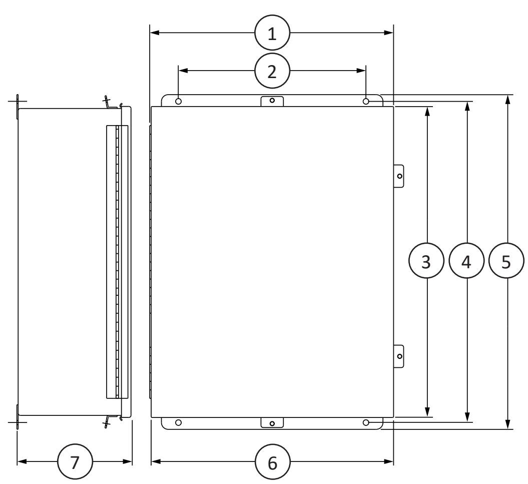
DIMENSIONS



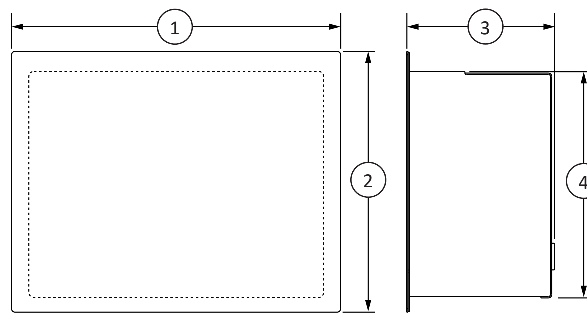


920i UNIVERSAL		
See Drawing	U.S. (in)	Metric (mm)
(1)	12.50	318
(2)	10.56	268
(3)	10.80	203
(4)	4.61	117
(5)	10.87	276
(6)	8.50	216
(7)	0.14	3.5

920i DEEP UNIVERSAL		
See Drawing	U.S. (in)	Metric (mm)
(1)	12.50	318
(2)	10.56	268
(3)	10.80	203
(4)	5.36	216
(5)	10.87	61
(6)	8.50	216



920i WALL MOUNT		
See Drawing	U.S. (in)	Metric (mm)
(1)	14.30	363
(2)	11.00	279
(3)	18.00	457
(4)	18.84	479
(5)	19.63	499
(6)	14.00	356



920i PANEL MOUNT		
See Drawing	U.S. (in)	Metric (mm)
(1)	11.56	294
(2)	9.16	233
(3)	5.20	132

FORCE MEASUREMENT SOLUTIONS

9320 HANDHELD BATTERY POWERED INDICATOR

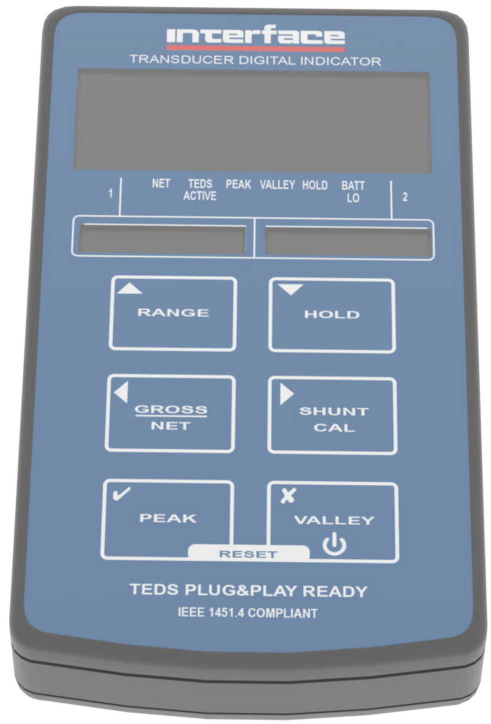
FEATURES & BENEFITS

- TEDS Plug & Play Ready
- 7 1/2 digital bipolar LCD display
- Dual range with unit labels
- Environmentally sealed
- Peak/valley hold
- Display hold
- Gross/net
- 25 Hz selectable update rate
- Shunt calibration
- Power save mode

SPECIFICATIONS

ELECTRICAL		
Excitation Voltage – VDC		5
Current – mA		59
PERFORMANCE		
Maximum Display		+9999999
Internal Resolution – bit		24
Signal Input Range – mV/V		5
Readings Per Second		to 25 selectable
Nonlinearity – %FS		0.005
ENVIRONMENTAL		
Operating Temperature	°C	-10 to +50
	°F	+14 to +122
Enclosure		Sealed IP65/NEMA 4X (when mating plug fitted)
POWER		
Power		2 x AA alkaline batteries
Battery Life – hrs		45 (450 in low power mode)
MECHANICAL		
Dimensions - W x H x D	mm	90 x 152 x 34
	in	3.5 x 6.0 x 1.3
Weight	g	250
	lbs	0.5
Display	mm	7 ½ digit LCD display, 8.8 digits
	in	7 ½ digit LCD display, 0.35 digits

STANDARD CONFIGURATION



MODEL 9320-1 (Shown)

OPTIONS

- Provides streaming ASCII for print, remote display and logging
- Internal mV/V calibration

9330 HIGH SPEED PORTABLE DISPLAY & DATA LOGGER

FEATURES & BENEFITS

- 24-bit resolution
- 3750 Hz update rate
- Peak and valley capture
- Log to SD card at 1000Hz
- U.S.B Port with software
- ±5V analog output
- Rechargeable battery
- 20 Hour battery life/300 hour standby
- Stores up to 6 sensor calibrations
- Powers up to 4x 350 ohm sensors
- 7 digit display

SPECIFICATIONS

ACCURACY – (MAX ERROR)		
Nonlinearity – %FS		+/- 0.02
TEMPERATURE		
Effect on Zero – %FS / °C		+/- 0.01
Effect on Output – % / °C		+/- 0.001
Operating Range	°C	-0 to +50
	°F	+32 to 122
Storage Range	°C	-20 to +70
	°F	-4 to +158
ELECTRICAL		
Input–mV/V		+/-3.5
Excitation Voltage – VDC		2.5 or 5
Internal Resolution – bit		24
Conversion rate – Hz		3750
Logging Rate to SD Card – Hz		1000
Filters		Selectable
Electrical Connection		15-pin DSUB
Supply – VDC		7-27
MECHANICAL		
Dimensions - W x H x D	mm	165.1 x 108.0 x 31.8
	in	6.50 x 4.25 x 1.25
Backlit Display	mm	9 HIGH, 16 character
	in	0.35 HIGH, 16 character
Weight	g	610
	lbs	1.34
Protection		IP51 / IP65

STANDARD CONFIGURATION

MODEL 9330-1 (Shown)

OPTIONS & ACCESSORIES

- IP65 Environmental Protection
- SD Card – Class 10

CE

Catalog 2019 06-15-2020

FORCE MEASUREMENT SOLUTIONS

9390 BATTERY POWERED INDICATOR

FEATURES & BENEFITS

- Large 1 in (25.4 mm) high contrast LCD display
- 6 digits
- 100,000 graduations
- Powers up to 4 load cells
- Battery-powered
- 15 updates/second typical
- Configurable standby mode for extended battery life
- Full front-panel digital calibration & configuration
- Three-stage digital filtering
- Full duplex RS-232

SPECIFICATIONS

ELECTRICAL		
Excitation Voltage – VDC		5 ±0.5, 4 x 350Ω load cells or 8 x 700Ω load cells
PERFORMANCE		
Maximum Display Counts		100,000
Analog Signal Input Range – mV/V		4.5
Sensitivity – µV		0.3/graduation min.
Measurement Rate – sec.		30, 15, 7.5, 3.75
ENVIRONMENTAL		
Operating Temperature	°C	-10 to 40
	°F	+14 to +104
POWER		
Power – VDC		9 provided by 6 “C” cells or included AC adaptor
MECHANICAL		
Weight		4.6 lb with batteries
Enclosure		NEMA 4X/IP66 stainless steel
Enclosure Dimensions - W x H x D	mm	228.6 x 140.21 x 76.2
	in	9.0 x 5.52 x 3
Display	mm	6 digit LCD, 25.4
	in	6 digit LCD, 1

OPTIONS

- Carrying case for portable U.S.e
- Please specify if CE mark is required

STANDARD CONFIGURATION

MODEL 9390-0 (Shown)

FORCE MEASUREMENT SOLUTIONS.

9840 INTELLIGENT INDICATOR

FEATURES & BENEFITS

- TEDS Plug & Play Ready IEEE 1451.4 compliant
- 1 or 2 channel
- Remote sense excitation
- 5 & 6 point linearization
- Bipolar
- ±999,999 display counts
- Nonlinearlity < ±0.005%
- Auto setup for multiple load cells
- Fast, direct analog output
- ±10 VDC scalable analog output – 16 bit
- Full duplex RS232C communication
- Peak/valley hold with front panel reset
- Front panel and remote tare
- 8 selectable digital filters
- Auto zero
- Front panel shunt calibration with two selectable resistors
- Display units conversion: Lb, Kg, N, Psi, Mpa, Klb, kN, t, mV/V, lbf-in, oz-in, Nm
- Two-line display
- Quadrature encoder channel available
- mV/V calibration
- U.S.B port

OPTIONS

- 2nd channel
- 2nd 16-bit scalable analog output
- Display Freeze/Remote Display Freeze
- 4-20 mA analog output
- Quad Limits
- RS485
- Multi-drop RS232
- Print Button
- 7-pin circular load cell connector
- Encoder Channel
- Second Line Enable on 1-channel unit
- Keylock
- TEDS 40
- TEDS 41
- Read/Write

STANDARD CONFIGURATION

MODEL 9840-100-1-T (Shown)

SPECIFICATIONS

EXCITATION		
Voltage – VDC		5 or 10
Current – MAX – mA		180
OUTPUTS		
Serial Interface		RS232 duplex
Output – Analog, 16 bit – VDC		Scalable, ±10
Output – Analog, Direct – Hz		1.5K
Output – Analog – mA		4–20 (optional)
Limits		Quad-programmable
PERFORMANCE		
Maximum Display Counts		±999,999
Display Update / sec.		4
Internal Resolution – bits		24
Signal Input Range – mV/V		±4.5
Programmable Count - by		1, 2, 5, 10, and 20
Conversion Rate / sec.		60
Maximum Error – %FS		0.01 ±1 count
CMRR – dB		115
ENVIRONMENTAL		
Operating Temperature	°F	+32 to +122
	°C	0 to +50
Storage Temperature	°F	+14 to +140
	°C	-10 to +60
Relative Humidity – % MAX	°F	95 (104) non-condensing
	°C	95 (40) non-condensing
POWER		
AC Power – VAC, Hz		115 or 230, 50–60
DC Power (option)		Available as a special
Power Consumption – watts		12
MECHANICAL		
Dimensions - W x H x D	in	7.5 x 2.5 x 9.5
	mm	190. 50 x 63.50 x 241.30
Weight	lbs	5
	kg	2.26796
Display		Vacuum Fluorescent
Unit Annunciator		Lb, Kg, Klb, kN, N, mV/V, lbf-in, oz-in, Nm

9850 MULTI-CHANNEL INDICATOR (U.S. AND METRIC)

FEATURES & BENEFITS

- High speed - 7800 samples/sec/channel
- Torque, speed, HP, load, angle, position display
- Works with torque sensors, load cells, encoders, LVDTs and speed pickups
- Powers up to 4 load cells
- 5 or 7-pole (based on input type) 200 Hz anti-alias filter plU.S. 4-pole digital filters
- Includes graphical logging software
- RS232, RS422, RS485
- Max/Min capture
- Two-line backlit LCD display
- Math channel for calculated values
- U.S.er definable units
- Scalable analog outputs

AVAILABLE INPUT CHANNELS

- AC mV/V
- DC mV/V
- ±5 or ±10 VDC
- 4-20 mA current
- Frequency (speed)
- Encoder/totalizer (angle or position)
- LVDT (position)

OPTIONS

- Second transducer channel
- Input type
- DC power
- Panel mount kit

STANDARD CONFIGURATION

MODEL 9850-100-1 (Shown)

SPECIFICATIONS

TRANSDUCER EXCITATION/SUPPLY		
AC mV/V – V rms, Hz - %		3, 3030, ±0.01
DC mV/V – VDC		5 or 10
±5 or ±10 VDC – V, mA		12, 220
4-20 mA – V, mA		15, 30
Frequency/Encoder/Totalizer – V, mA		5, 250 and/or 12, 125
LVDT – V rms		2, selectable frequency
OUTPUTS		
Serial Interface		RS232/RS422/RS485
Output – Analog, 12 bit – VDC		2 Scalable, ±5, or ±10
Limits		HI/LO, per channel
PERFORMANCE		
Maximum Display Counts		10,000
Display Update / sec.		4
Internal Resolution – bits		±14
Conversion Rate / sec.		7800
Maximum Error – %FS		0.02
ENVIRONMENTAL		
Operating Temperature	°F	+41 to +122
	°C	+5 to +50
Relative Humidity – MAX %	°F	95(104), non-condensing
	°C	95(40), non-condensing
POWER		
AC Power	VAC	90 to 250
	Hz (VA MAX)	50-60 (25)
DC Power – VDC (watts MAX)		10-15 (15)
MECHANICAL		
Dimensions – W x H x D	in	6.5 x 2.5 x 8.7
	mm	165.1 x 63.5 x 220.98
Weight	lbs	3
	kg	1.36078
Display		Backlit LCD

7418 East Helm Drive • Scottsdale, Arizona 85260 • 480.948.5555 • www.interfaceforce.com

interface
FORCE MEASUREMENT SOLUTIONS.

9860 TEDS HIGH SPEED SELF-CONFIGURING DIGITAL INDICATOR

FEATURES & BENEFITS

- Bright-6 digit bipolar LED display (±32,768 counts)
- 0.01% accuracy
- Fast, direct, scaleable analog output with 1000 Hz bandwidth
- 230 readings per second
- Peak and valley monitoring
- 4 calibration modes: mV/V, applied load, shunt and TEDS plug & play
- Excitation sense
- 4 limit setpoints with open controller outputs
- Front panel shunt and tare
- Remote tare

SPECIFICATIONS

EXCITATION		
Excitation Voltage – VDC		5, 10 switch selectable (internal)
Current – mA		60, 120 (respectively)
PERFORMANCE		
Maximum Display Counts		±999,999
Display Update/sec		5
Internal Resolution Counts		±32,768
Signal Input Range – mV		±25, ±50 (switch selectable)
Sensitivity – µV/count		0.8
Readings Per Second		230
Maximum Error – % ±count		0.01 of reading ±1
CMR – dB		120
Scalable Analog Output– VDC & mA		±10 & 4-20 (self-calibrating)
RS232 Output		
ENVIRONMENTAL		
Operating Temperature	°C	-10 to +50
	°F	+14 to +122
Relative Humidity – %	°C	90% at 40, non-condensing
	°F	90% at 104, non-condensing
POWER		
AC	VAC	100 to 250
	Hz	50-60
Power Consumption – w		6
MECHANICAL		
Dimensions - W x H x D	mm	96 x 48 x 130
	in	3.78 x 1.89 x 5.1
Weight	g	589.79
	lbs	1.3
Display	mm	LED 14 segment, 10 H
	in	LED 14 segment, 0.4 H
Panel Cutout - W x H	mm	92 x 45
	in	3.62 x 1.77

OPTIONS & ACCESSORIES

- Bench top enclosure
- Plexiglass bench top tilt stand
- Remote peak/valley reset
- Software kit for display, setup & logging

STANDARD CONFIGURATION

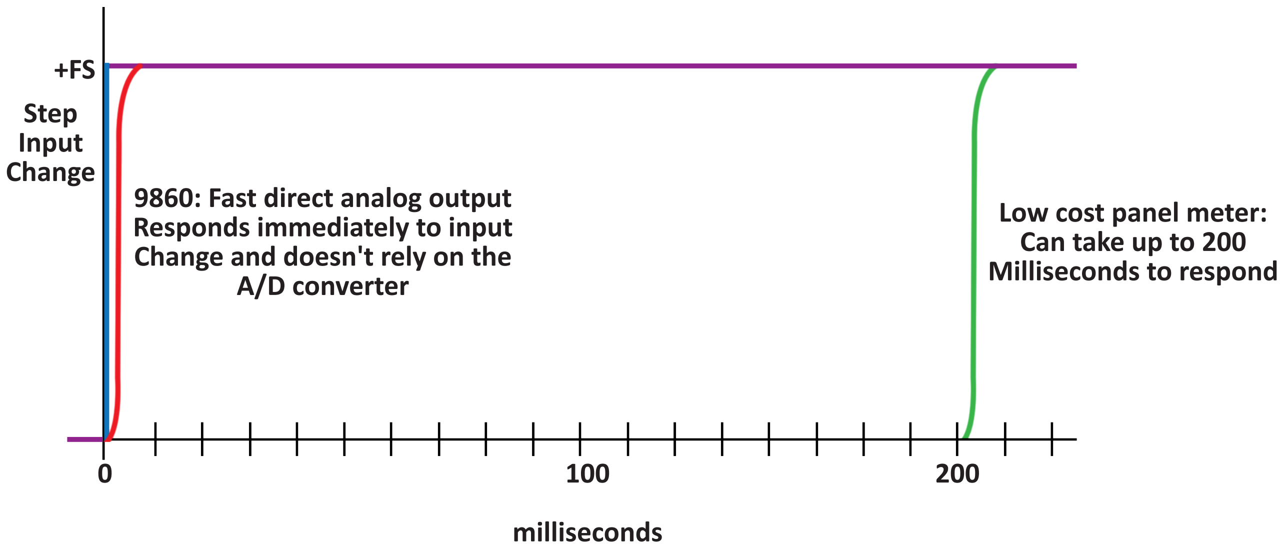
MODEL 9860-1 W/9800-STAND (Shown)

MODEL 9860-1 W/9860ASY-4T (Shown)

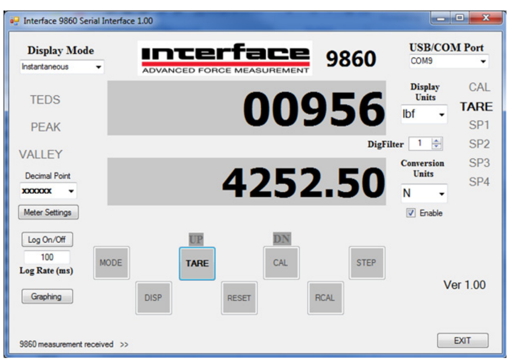
9860 TEDS HIGH SPEED SELF-CONFIGURING DIGITAL INDICATOR

KEY FEATURE

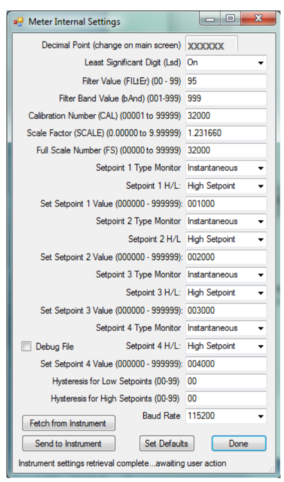
High Speed Direct Analog Output - *Allows accurate capture of quickly changing events*



SOFTWARE



Display



Set Up

	A	B	C
1	Date	Time	Reading
2	4/14/2014	16:16:57.7161-07:00	956
3	4/14/2014	16:16:57.8781-07:00	956
4	4/14/2014	16:16:57.9711-07:00	956
5	4/14/2014	16:16:58.0771-07:00	956
6	4/14/2014	16:16:58.1891-07:00	956
7	4/14/2014	16:16:58.3001-07:00	956
8	4/14/2014	16:16:58.3941-07:00	956
9	4/14/2014	16:16:58.5041-07:00	956
10	4/14/2014	16:16:58.6201-07:00	956
11	4/14/2014	16:16:58.7241-07:00	956
12	4/14/2014	16:16:58.8211-07:00	956
13	4/14/2014	16:16:58.9322-07:00	956
14	4/14/2014	16:16:59.0372-07:00	956
15	4/14/2014	16:16:59.1492-07:00	956
16	4/14/2014	16:16:59.2512-07:00	956
17	4/14/2014	16:16:59.3492-07:00	956

Logging

BSC4 4-CHANNEL BRIDGE AMPLIFIER (U.S. & METRIC)

FORCE MEASUREMENT SOLUTIONS.

FEATURES & BENEFITS

- ±10V and 4-20mA or U.S.B outputs
- 4 independent channels
- For U.S.e with model 3AXX series 3-axis load cells
- Can be U.S.ed with up to any 4 Standard load cells (with mV/V output)

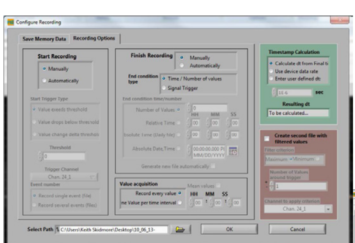
SPECIFICATIONS

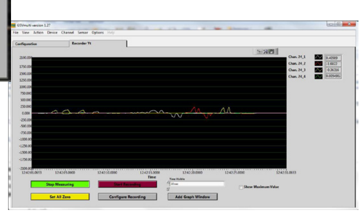
PERFORMANCE		BSC4A	BSC4D
Signal Input Range – mV/V		up to 10	up to 10
Accuracy Class – %		0.05	0.05
CMR – dB @ 60 Hz		95 - 110	95 - 110
Data Rate – Hz		N/A	0 - 900
Sampling Frequency – MHz		N/A	1.92
Cut-Off Frequency – analog – Hz		250	1000
Cut-Off Frequency – digital		N/A	Notch Filler
Resolution – bit		Analog	16
EXCITATION			
Excitation Voltage - V		5	2.5
Excitation Current – mA		10	10
Supply Voltage – VDC		11 to 30	4.5 - 5.5 from U.S.B
Supply Current – mA		< 1000	< 200
ENVIRONMENTAL			
Operating Range	°C	-10 to +65	-10 to +65
	°F	+14 to +149	+14 to +149
Storage Range	°C	-40 to +85	-40 to +85
	°F	-40 to +185	-40 to +185
Zero Drift/ °C		0.005%	0.005%
Sensitivity Drift/ °C		0.001%	0.001%

OPTIONS

- M12 load cell connectors (4x)

SOFTWARE SCREEN SHOTS



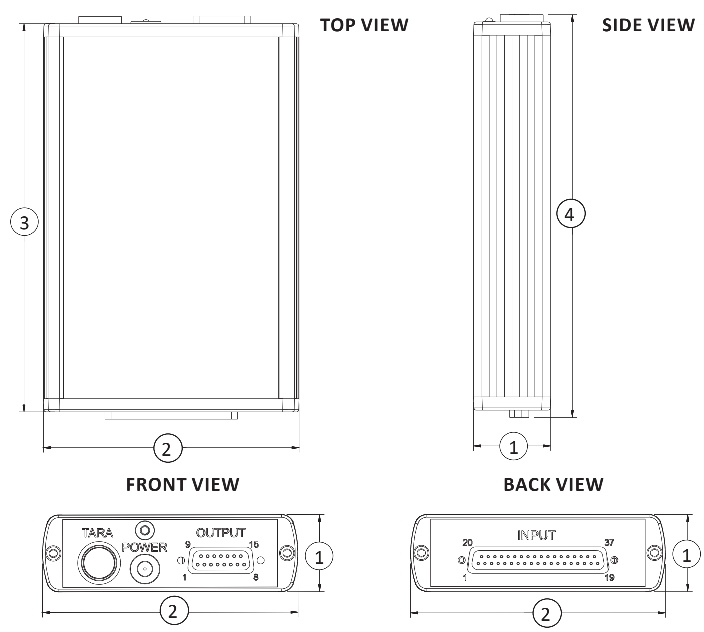


STANDARD CONFIGURATION

BSC4A (Shown)

BSC4D (Shown)

MODEL	DESCRIPTION
BSC4A	±10V and 4-20mA output, up to 10 mV/V input, 37-pin input connector. Includes power supply
BSC4D	U.S.B output, up to 10 mV/V input, 37-pin input connector, U.S.B powered. Includes graphing and logging software



DIMENSIONS

1		2		3		4	
mm	in	mm	in	mm	in	mm	in
32.0	1.25	106.0	4.17	161.0	6.33	169.0	6.65

Interface
FORCE MEASUREMENT SOLUTIONS.

BX8-AS INTERFACE BLUEDAQ SERIES DATA ACQUISITION SYSTEM (U.S. & METRIC)

FEATURES & BENEFITS

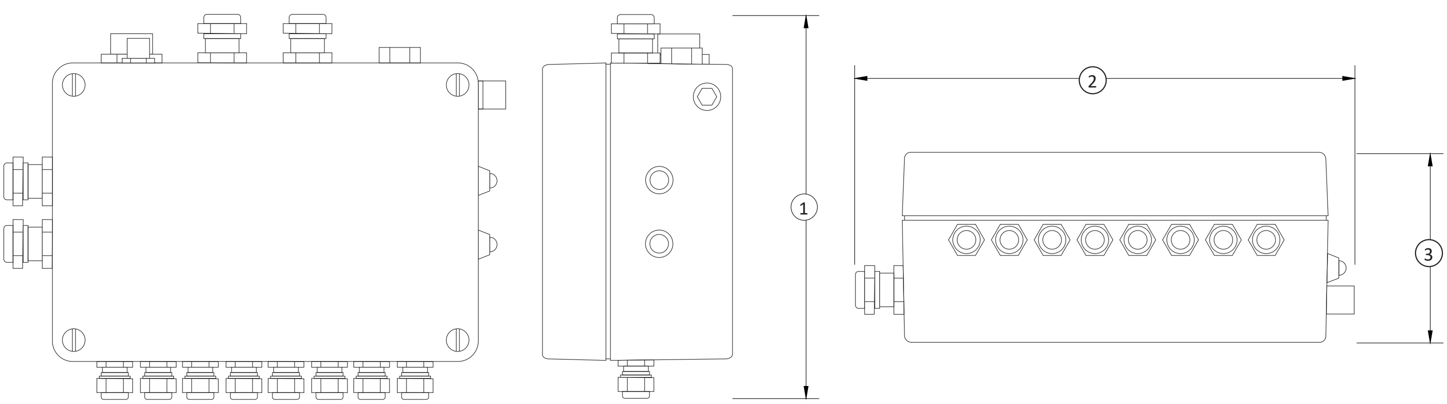
- 8-Channel synchronized sampling
- Internal calculation of axis load values for 6-axis sensors
- Active scaling of analog outputs according to internal calculations
- ±5V, ±10V, 4-20mA, and 0-20 mA outputs
- 48K samples/sec/channel
- 24-bit internal resolution
- U.S.B connection to PC
- Includes graphing and logging software
- Strain gage, mV/V, ±10VDC, and PT 1000 Temperature inputs
- Excitation sense
- Full, ½ and ¼ bridge compatible with 120, 350, and 1000 ohm bridge completion
- TEDS compatible
- ZERO button for 8-channel simultaneoU.S. tare
- 16 digital I/O
- Galvanic isolation: Analog input, analog output, digital I/O, U.S.B

OPTIONS

- EtherCat
- CANbU.S./CANopen

STANDARD CONFIGURATION

MODEL BX8-AS (Shown)



DIMENSIONS

1		2		3	
mm	in	mm	in	mm	in
180	7.1	225	8.87	89.5	3.5

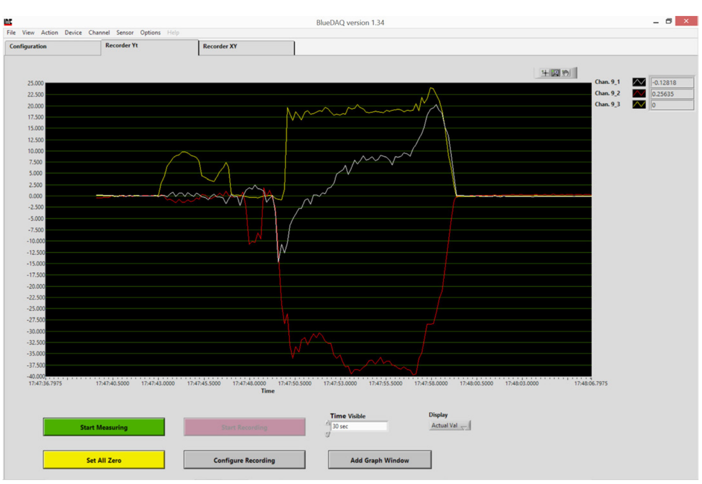
BX8-AS INTERFACE BLUEDAQ SERIES DATA ACQUISITION SYSTEM (U.S. & METRIC)

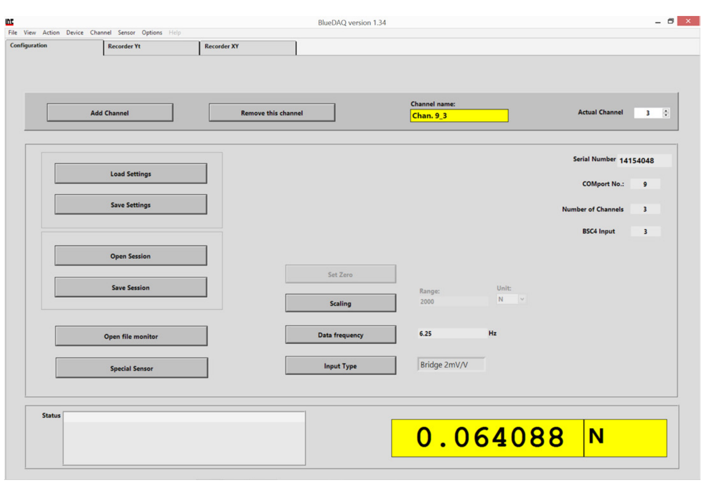
SPECIFICATIONS

PERFORMANCE	
Accuracy Class – %	0.05
Nonlinearity – % range	+/- 0.02
Sample Rate - per channel – samples/sec	48,000S synchronoU.S.
Digital Output Data Rate – values/sec	0.75 to 48,000
Resolution – bit	24
Resolution – noise limited	> 100,000 parts @ 10/s data rate > 20,000 parts @ 2000/s data rate > 9,400 parts @ 12,000/s data rate
Signal Input Filter – (3dB) – Hz	28, 850, 11.4k 1st order, switchable
Digital Onput Filter – (3dB) – Hz *Individually configurable for each channel*	0.18 to 15K includes high pass, low pass, band pass and band stop
SENSOR INPUTS	
Input Channels	8
Bridge Input Range – mV/V	2.0, 3.5, or 7.0
Bridge Input Impedance – MΩ - (pF)	> 20 (300)
Bridge Excitation Voltage – VDC	8.75, 5, or 2.5
Bridge Excitation Current – mA	135
Bridge Input Type – wire	4 or 6
Bridge Completion – Ω	¼ and ½, 120, 350 or 1000
CMMR – dB – DC – 100 Hz	>120, >100
Analog Input Range – VDC	+/-10
Analog Input Resistance – MΩ	10
PT1000 thermocouple – Ω	1000

ANALOG OUTPUTS		
Outputs types – V – mA *Individually configurable for each channel*		±10, ±5, 0-5, 0-10, 4-20, 0-20
Analog Output Scaling		Via software, active scaling capability
Analog Output Resolution – bit		16 over scaled range
Analog Output Update Rate – Hz		Up to 48K
DIGITAL INPUTS/OUTPUTS		
DIOs		16 configurable
U.S.B - 8 channel packets – bit – /sec		16 integer, 48K, raw data 24 integer, 24K, raw data 32 floating point, 9.6K, scaled data 6-axis sensor: 32 floating point, 6K scaled data
ENVIRONMENTAL		
Operating Temperature Range	°C	0 to +50
	°F	+32 to +122
Storage Temperature Range	°C	-20 to +70
	°F	-4 to +158
POWER		
Supply – VDC		12-28
Supply – Watt		< 12
MECHANICAL		
Dimensions (L x W x H)	mm	222 x 180 x 89.5
	in	8.7 x 7.1 x 3.52
Weight	kg	2.4
	lbs	5.29
Protection Level		IP67
Connection Type		24-pin M16 or screw terminals

BLUEDAQ SOFTWARE





FORCE MEASUREMENT SOLUTIONS.

BX8-HD15 INTERFACE BLUEDAQ SERIES DATA ACQUISITION SYSTEM (U.S. & METRIC)

FEATURES & BENEFITS

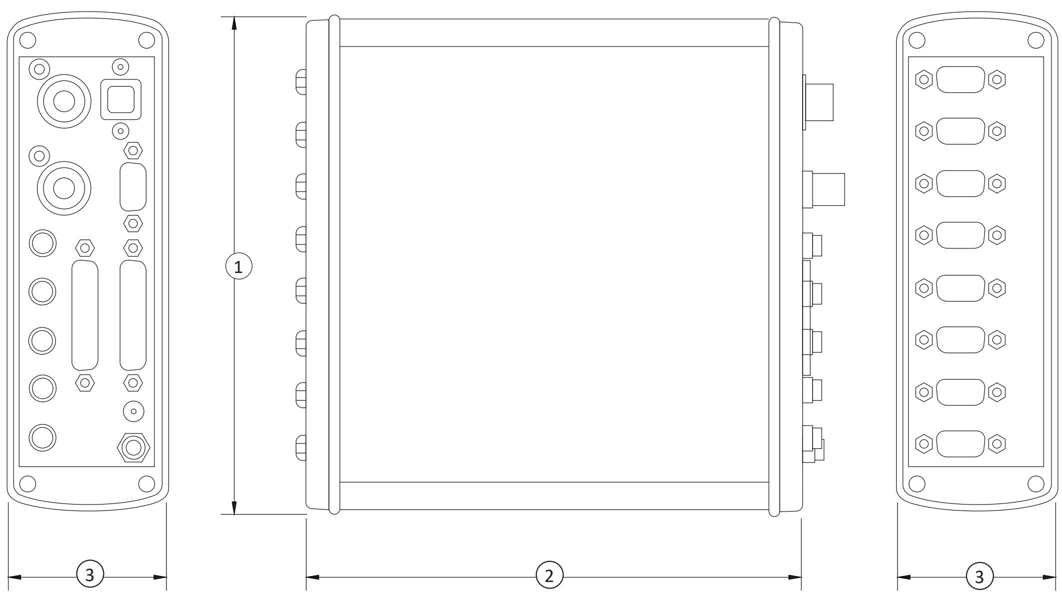
- 8-Channel synchronized sampling
- Internal calculation of axis load values for 6-axis sensors
- Active scaling of analog outputs according to internal calculations
- ±5V, ±10V, 4-20mA, and 0-20 mA outputs
- 48K samples/sec/channel
- 24-bit internal resolution
- U.S.B connection to PC
- Includes graphing and logging software
- Strain gage, mV/V, ±10VDC, and PT 1000 Temperature inputs
- Excitation sense
- Full, ½ and ¼ bridge compatible with 120, 350, and 1000 ohm bridge completion
- TEDS compatible
- ZERO button for 8-channel simultaneoU.S. tare
- 16 digital I/O
- Galvanic isolation: Analog input, analog output, digital I/O, U.S.B

OPTIONS

- EtherCat
- CANbU.S./CANopen

STANDARD CONFIGURATION

MODEL BX8-HD15 (Shown)



DIMENSIONS

1		2		3	
mm	in	mm	in	mm	in
172	6.8	172	6.8	55	2.2

BX8-HD15 INTERFACE BLUEDAQ SERIES DATA ACQUISITION SYSTEM (U.S. & METRIC)

SPECIFICATIONS

PERFORMANCE	
Accuracy Class – %	0.05
Nonlinearity – % range	±0.02
Sample Rate – per channel – samples/sec	48,000 synchronoU.S.
Digital Output Data Rate – values/sec	0.75 to 48,000
Resolution – bit	24
Resolution – noise limited	> 100,000 parts @ 10/s data rate > 20,000 parts @ 2000/s data rate > 9,400 parts @ 12,000/s data rate
Signal Input Filter – (3dB) – Hz	28, 850, 11.4k 1st order, switchable
Digital Onput Filter – (3dB) – Hz *Individually configurable for each channel*	0.18 to 15K includes high pass, low pass, band pass and band stop

SENSOR INPUTS	
Input Channels	8
Bridge Input Range – mV/V	2.0, 3.5, or 7.0
Bridge Input Impedance – MΩ – (pF)	> 20 (300)
Bridge Excitation Voltage – VDC	8.75, 5, or 2.5
Bridge Excitation Current – mA	135
Bridge Input Type – wire	4 or 6
Bridge Completion – Ω	¼ and ½, 120, 350 or 1000
CMMR – dB – DC – 100 Hz	>120, >100
Analog Input Range – VDC	±10
Analog Input Resistance – MΩ	10
PT1000 thermocouple – Ω	1000

ANALOG OUTPUTS	
Outputs types – V – mA *Individually configurable for each channel*	±10, ±5, 0-5, 0-10, 4-20, 0-20
Analog Output Scaling	Via software, active scaling capability
Analog Output Resolution – bit	16 over scaled range
Analog Output Update Rate – Hz	Up to 48K

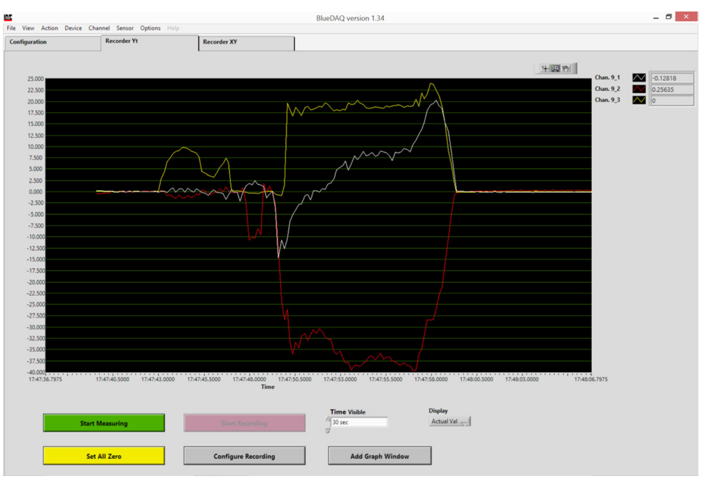
DIGITAL INPUTS/OUTPUTS	
DIOs	16 configurable
U.S.B – 8 channel packets – bit – /sec	16 integer, 48K, raw data 24 integer, 24K, raw data 32 floating point, 9.6K, scaled data 6-axis sensor: 32 floating point, 6K scaled data

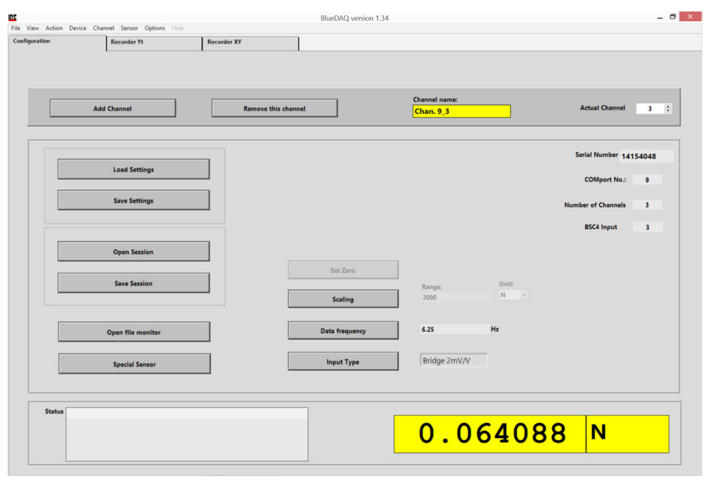
ENVIRONMENTAL		
Operating Temperature Range	°C	0 to +50
	°F	+32 to +122
Storage Temperature Range	°C	-20 to +70
	°F	-4 to +158

POWER	
Supply – VDC	12-28
Supply – Watt	< 12

MECHANICAL		
Dimensions (L x W x H)	mm	172 x 171 x 55
	in	6.8 x 6.7 x 2.2
Weight	kg	1.3
	lbs	2.87
Protection Level		IP67
Connection Type		15-pin High Density D-Sub Connector

BLUEDAQ SOFTWARE





BX8-HD44 INTERFACE BLUEDAQ SERIES DATA ACQUISITION SYSTEM (U.S. & METRIC)

FEATURES & BENEFITS

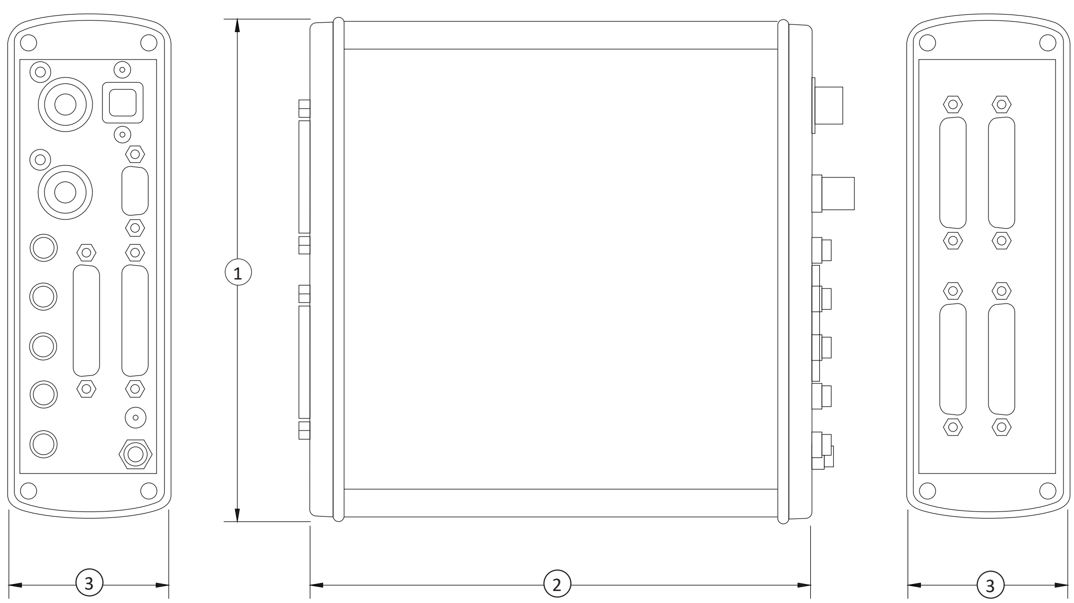
- 8-Channel synchronized sampling
- Internal calculation of axis load values for 6-axis sensors
- Active scaling of analog outputs according to internal calculations
- ±5V, ±10V, 4-20mA, and 0-20 mA outputs
- 48K samples/sec/channel
- 24-bit internal resolution
- U.S.B connection to PC
- Includes graphing and logging software
- Strain gage, mV/V, ±10VDC, and PT 1000 Temperature inputs
- Excitation sense
- Full, ½ and ¼ bridge compatible with 120, 350, and 1000 ohm bridge completion
- TEDS compatible
- ZERO button for 8-channel simultaneoU.S. tare
- 16 digital I/O
- Galvanic isolation: Analog input, analog output, digital I/O, U.S.B

STANDARD CONFIGURATION

MODEL BX8-HD44 (Shown)

OPTIONS

- EtherCat
- CANbU.S./CANopen



DIMENSIONS

1		2		3	
mm	in	mm	in	mm	in
172	6.8	172	6.8	55	2.2

BTS Bluetooth® TELEMETRY SYSTEM

The BTS-AM-1 is a Bluetooth Low Energy (BLE) strain bridge transmitter module that provides access to high quality measurements on a mobile platform such as a phone or tablet.

The delivery mechanism is BLE which utilizes the flexibility and availability of Bluetooth receivers while maintaining the low power requirements of embedded systems. BTS is built upon two complimentary principles of BLE: 1) broadcast advertising data which enables U.S.ers to deliver the same data to multiple receivers simultaneoU.S.ly and 2) low power paired connections which can be U.S.ed in a point to point system.

One to One

Multiple to One

One to Multiple

Multiple to Multiple

The BTS comes in two versions:

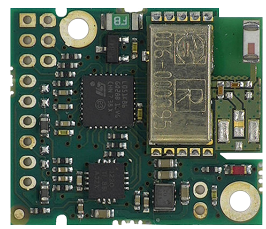
- HoU.S.ed in an our 'C' style enclosure with integrated battery holder, which makes it suitable for integration
- Bare board format, which allows the module to be built into OEM applications

FEATURES & BENEFITS

- **High Measurement Resolution:** BTS-AM-1 can produce a noise free resolution of 1 in 92000 counts (16.5 bit) when U.S.ed with a 3mV/V sensor and 1 in 184,000 counts (17.5 bit) when U.S.ed with a 6mV/V sensor.
- **Simple Integration into iOS and Android Apps:** Advert format and encoding as well as details on connected services are available to facilitate integration of the device within cU.S.tom apps for OEM applications.
- **Range:** Ranges achievable between 30 to 90 m line of sight depending on age and quality of viewing device.
- **Advanced Protection:** Configuration PIN, View PIN and Calibration PIN allow you to take control of your end U.S.ers experience and prevent any unwanted changes in configuration that can compromise measurement quality.

STANDARD CONFIGURATION

MODEL BTS-AM-1 (Shown)



MODEL BTS-OEM-1 (Shown)

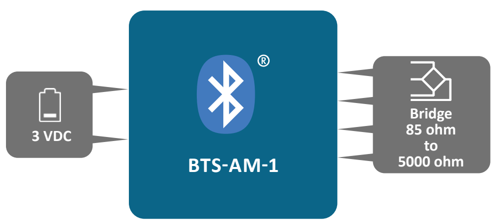
BTS MOBILE APP (Shown)

A free iOS and Android app is available for download, which enables U.S.ers to create dashboards with varying degrees of detail based on application requirements. It enables BTS systems to be visualized on phones and tablets by U.S.ing digital displays, gages, tanks and charts. Displayed data can be defined as mathematical expressions consisting of readings from multiple transmitters, functions and constants. The app also facilitates BTS module configuration and calibration.

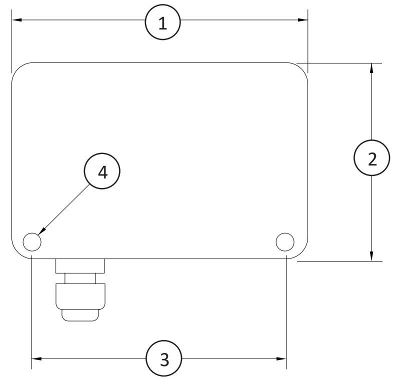
BTS Bluetooth® TELEMETRY SYSTEM

SPECIFICATIONS

Parameter	
Strain Gauge Excitation System	4 Wire
Strain Gauge Excitation Voltage (Nom)	3 V dc
Strain Gauge Drive Capability	85 to 5000 ohms
Strain Gauge Sensitivity	Up to ±48 mV/V
Offset Temperature Stability	±5 ppm / ºC
Gain Temperature Stability (Max)	4 ppm / ºC
Non Linearity before Linearization	6 ppm of FR
Internal Resolution	24 bits
Noise free resolution @ 2.5 mV/V:	
At 1 sample	14.25 bits
At 2 samples	15.25 bits
At 4 samples	16.00 bits
At 8 samples	16.75 bits
Battery Life at 1 Sample per Second	
2 X AA cells, Transmitting 24 hr/day	10 months
Power Supply	
Standby (Max)	10 µA
Power Supply Voltage	2.3 – 3.6 Vdc
Power Supply Ripple	50 mV ac pk-pk
Peak Current (1K Bridge)	30 mA
Environmental	
Operating Temperature Range	-40 to +85 ºC
Storage Temperature Range	-40 to +85 ºC
Maximum Humidity	Up to 95% non condensing
Protection (B24-SSBC only)	IP67



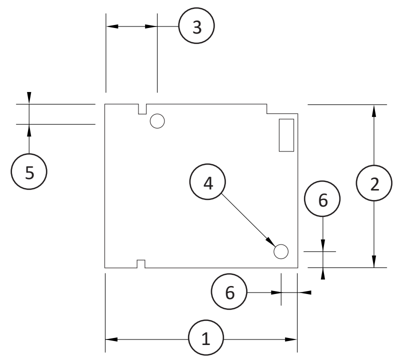
ELECTRICAL



BTS-AM-1 (2) "AA" Size Batteries

DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	80	3.1
(2)	62	2.4
(3)	66.5	2.6
(4)	Ø4.8	Ø0.2
Height	34	1.3



BTS-OEM-1

DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	25	0.98
(2)	21.5	0.85
(3)	6.8	0.27
(4)	Ø2.1	Ø0.08
(5)	2.1	0.08
(6)	2.3	0.09
Height	3.6	0.14

CSC & LCSC-OEM INTEGRAL INLINE SIGNAL CONDITIONER

FEATURES & BENEFITS

- Outputs 4-20mA, 0-10V, 0-5V, ±10V, ±5V
- Zero and span adjU.S.tments
- 1kHz bandwidth
- CE approved (CSC)
- High noise immunity
- Great for OEM applications (LCSC)
- Reverse polarity protected

SPECIFICATIONS

EXCITATION			
Excitation Voltage – VDC			5
Excitation Current – mA MAX			15
PERFORMANCE			
Bandwidth – Hz			1000
Span AdjU.S.tment Range – %FRO			±8
Zero AdjU.S.tment Range – %FRO			±2
Nonlinearity – %FS			0.02
Span Temperature Coefficient – % ºF			±0.0036
Zero Temperature Coefficient – %FRO ºF			±0.0014
ENVIRONMENTAL			
Operating Range		°C	-40 to +85
		°F	-40 to +185
MECHANICAL			
Enclosure	CSC		Stainless steel IP67
	LCSC		Plastic
Reverse Polarity Protection – V			~30
Dimensions – W x H x D	CSC	mm	Ø 55.8 x 27.94
		in	Ø 2.2 X 1.1
	LCSC	mm	69.85 x 16.51 x 31.75
		in	2.75 x 0.65 x 1.25

OPTIONS

- U.S.er-specified cable lengths
- U.S.er-specified conditioner in data path
- Special Calibration

STANDARD CONFIGURATION

CSC (Shown)

LCSC-OEM (Shown)

Model	Output	Power Supply	
		VDC	mA nom
CSC and LCSC-0	4-20mA Unipolar Comp +	13 to 28	26
CSC and LCSC-1	±10 V Bipolar	14 to 18	30
CSC and LCSC-2	0.1-10 V Unipolar Ten +	13 to 28	22
CSC and LCSC-3	0.1-10 V Unipolar Comp +	13 to 28	22
CSC and LCSC-4	±10V Bipolar	±13 to ±15	22
CSC and LCSC-5	±5V Bipolar	14 to 18	30
CSC and LCSC-6	0.1-5V Unipolar Ten +	8.5 to 28	22
CSC and LCSC-7	0.1-5V Unipolar Comp +	8.5 to 28	22
CSC and LCSC-8	4-20mA Bipolar Ten +	13 to 28	26
CSC and LCSC-9	4-20mA Unipolar Ten +	13 to 28	26
CSC and LCSC-10	4-20mA Unipolar Comp + (2-wire)	7.5 to 28	20
CSC and LCSC-11	4-20mA Unipolar Comp + (2-wire)	7.5 to 28	20

Applications Note: The Signal Conditioner models CSC and LCSC come installed and calibrated to your choice of load cell and cabling.

Reference Note: For information regarding Model CSD Embedded Load Cell Converter and Digitizer modules, see product-specific datasheet.

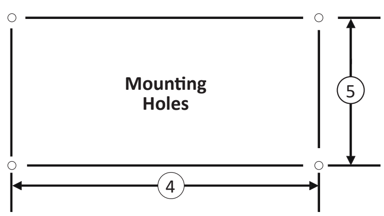
DCA VEHICLE COMPATIBLE SIGNAL CONDITIONER (U.S. & METRIC)

FEATURES & BENEFITS

- 10-28 VDC power
- U.S.er selectable analog output ±10V, ±5V or 4-20 mA
- Small size
- NEMA 4X enclosure
- DC to 100 Hz
- Ideal for battery powered appplications

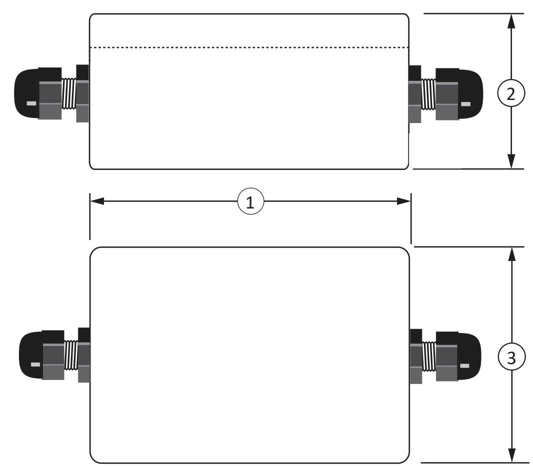
SPECIFICATIONS

EXCITATION		
Excitation Voltage – VDC		5 or 10
Excitation Current – mA MAX		30
PERFORMANCE		
Output 1		±5V or ±10V Full Scale
Output 2		4-20 mA Full Scale Unipolar
Input Range – mV FS		5 to 50
Dynamic Response – Hz		DC to 100
Zero Offset Range – % FS		±50 Output
Coarse and fine adjU.S.t Nonlinearity – %FS		0.01
ENVIRONMENTAL		
Operating Temperature	°C	0 to +70
	°F	+32 to +158
POWER		
DC – VDC		10-28



STANDARD CONFIGURATION

MODEL DCA (Shown)



DIMENSIONS

1		2		3		4		5	
in	mm	in	mm	in	mm	in	mm	in	mm
3.70	94.0	2.24	56.9	2.56	65.0	3.11	79	1.96	50

INTERFACE
FORCE MEASUREMENT SOLUTIONS.

VSC VEHICLE POWERED SIGNAL CONDITIONER

FEATURES & BENEFITS

- High accuracy precision bi-polar differential amplifier
- +/-5VDC Output
- Accepts inputs from 1mV/V to 4.5 mV/V
- 50 Hz bandwidth
- Internal shunt calibration resistor
- Compact size

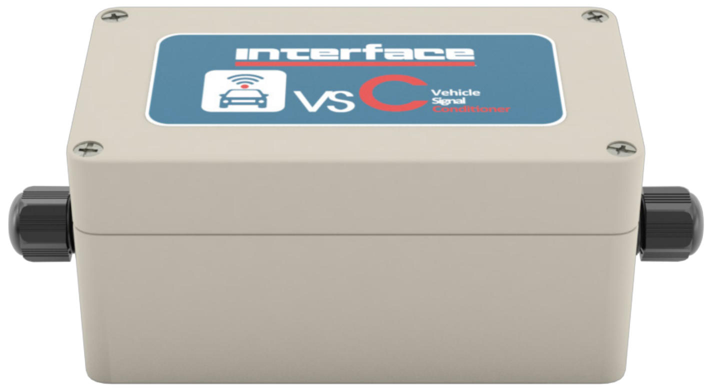
OPTIONS

- Up to 10KHz bandwidth
- Special gain
- Remote shunt calibration

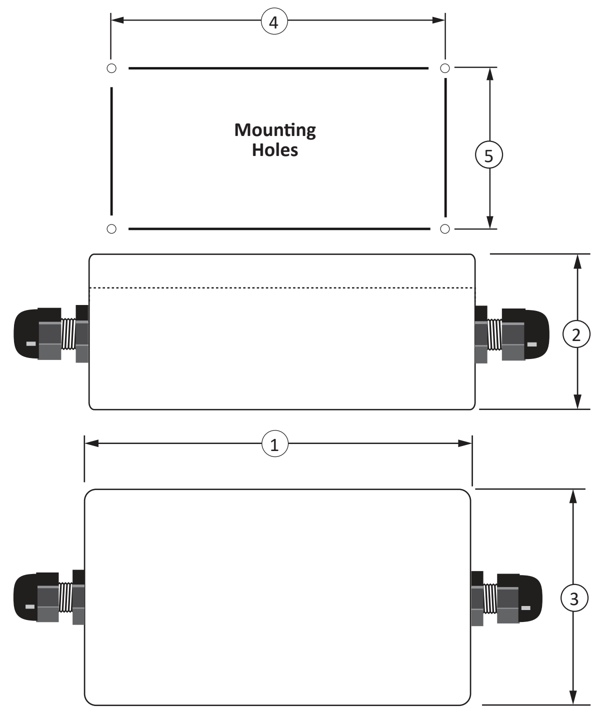
SPECIFICATIONS

EXCITATION		
Excitation Voltage – VDC		8
PERFORMANCE		
Output – V		+/-5
Ripple – mV		1.2mV RMS typical (5mV P-P max)
Input Range – mV/V		1-4.5
Bridge Resistance - Ohms		350
Filter – 3dB-Hz		50
Offset AdjU.S.tment		+/-30% typical
Nonlinearity - %		0.005
Zero and Span Temp - %FS/°C		<0.01
ENVIRONMENTAL		
Operating Temperature	°C	0 to +70
	°F	+32 to +158
POWER		
Supply – VDC		9-36
Ripple - %		<10
Current - mA (mA @ V)		65 @ 12
Protection		Reverse Polarity
MECHANICAL		
Protection Level		IP67
Electrical Connections		Screw terminals (through cable gland)

STANDARD CONFIGURATION



MODEL VSC (Shown)



DIMENSIONS

	in	mm
1	4.5	114.3
2	2.1875	55.56
3	2.5	63.5
4	4.0625	103.19
5	2.125	53.96

interface
FORCE MEASUREMENT SOLUTIONS.

DIG-U.S.B & DIG-U.S.B-OEM (U.S. & METRIC)

FEATURES & BENEFITS

- Digital I/O
- High stability
- Peak and valley recording
- OEM PCB version available
- Up to 500 samples/seconds
- Windows driver DLL's available
- Rugged ABS IP50 enclosure (DIG-U.S.B)
- Works with mV/V force and torque devices
- Includes configuration, calibration, graphing, logging, and display software
- Simple and easy to connect to your strain gage sensor
- U.S.B Interface – device appears as virtual com port

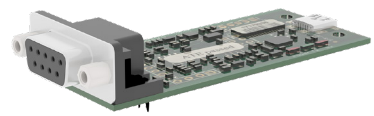
Digital U.S.B output modules for load cells, torque transducers and other strain gaged devices

SPECIFICATIONS

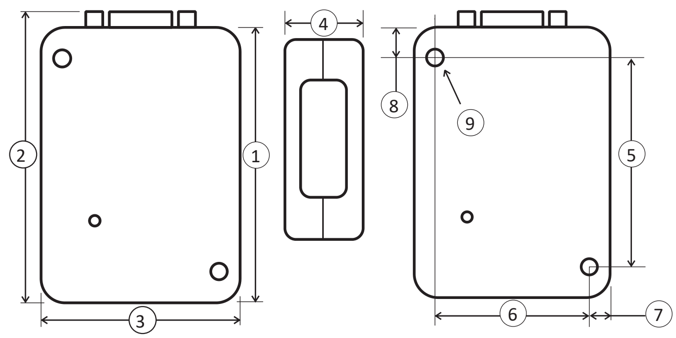
POWER		
DIG-U.S.B (from U.S.B) – VDC, mA		5, 75
Strain Gage Excitation System		4 wire
PERFORMANCE		
Sample Rate / sec.		500
Data Transmission Rate – kbps Max		460.8
Input Range – mV/V		±4.5
Nonlinearity Before Linearization – % FS Max		0.0025
Offset Temperature Stability – ppm FS Max		160
Gain Temperature Stability – ppm FS Max		300
Overall Resolution		16 Million
Res @ 1Hz Readings (Noise Stable) Over 100s		200,000 Counts/Divs
Res @ 10Hz Readings (Noise Stable) Over 100s		120,000 Counts/Divs
Res @ 100Hz Readings (Noise Stable) Over 100s		50,000 Counts/Divs
Res @ 500Hz Readings (Noise Stable) Over 100s		18,000 Counts/Divs
Signal Filter		Dynamic recursive type U.S.er programmable
ENVIRONMENTAL		
Operating Temperature Range	°C	-40 to +85
	°F	-40 to +185
Storage Temperature Range	°C	-40 to +85
	°F	-40 to +185
Material		
U.S.B to Micro U.S.B Cache	m	1.5
	ft	5

STANDARD CONFIGURATION

MODEL DIG-U.S.B (Shown)



MODEL DIG-U.S.B-OEM (Shown)



DIMENSIONS

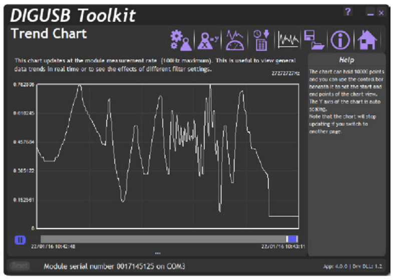
See Drawing	1	2	3	4	5	6	7	8	9
mm	70.5	74.5	51.0	20.0	54.5	40	4	8	Ø4.2
in	2.78	2.93	2.01	0.79	2.15	1.57	0.16	0.31	Ø0.17

OPTIONS

- DIG-U.S.B (with case)
- DIG-U.S.B-OEM (without case)
- DIN Rail Mount Kit

SOFTWARE

- XP, Vista, Win 7, 8, 10



interface
FORCE MEASUREMENT SOLUTIONS.

DIG-U.S.B-F & DIG-U.S.B-F-OEM (U.S. & METRIC)

FEATURES & BENEFITS

- Up to 4,800 samples / second
- 13-bit noise-free resolution
- Extremely low Temperature drift
- Simple U.S.B 'Plug and Measure' device connects directly to a PC
- Powers up to four 350 ohm load cells
- Works with mV/V force or torque transducer
- Rugged ABS IP50 enclosure (DIG-U.S.B)
- Includes configuration, calibration, graphing, logging and display software
- Peak/valley recording and monitoring
- OEM PCB version available
- Windows driver DLL's available
- Simple and easy to connect to your strain gage sensor
- Ideal for impact, drop, reaction torque, vibration and materials testing

SPECIFICATIONS

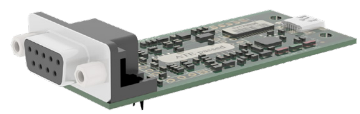
POWER		
Current (from U.S.B) – mA		75
Excitation – VDC		5
Strain Gauge Excitation System		4-wire
PERFORMANCE		
Sample Rate / sec		4,800
Input Range – mV/V		±4.5
Nonlinearity Before Linearization – %FS Max		±0.0025
Offset Temperature Stability – °C		±0.0004
Gain Temperature Stability – °C		±0.0005
Overall Resolution		16 Million counts/divs
Res @4.8 kHz Readings (Noise Stable) over 1s		8,192 or 13 Bits counts/divs
ENVIORNMENTAL		
Operating Temperature Range	°C	-40 to +85
	°F	-40 to +185
Storage Temperature Range	°C	-40 to +85
	°F	-40 to +185
MECHANICAL		
IP Ratings for DIG-U.S.B-F (Enclosure)		IP50
U.S.B to Micro U.S.B Cable Length	m	1.5
	ft	5

OPTIONS

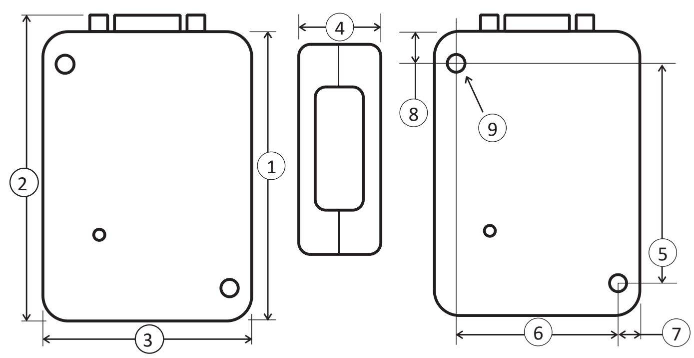
- DIG-U.S.B-F (with case)
- DIG-U.S.B-F-OEM (without case)
- DIN Rail Mount Kit

STANDARD CONFIGURATION

MODEL DIG-U.S.B-F (Shown)



MODEL DIG-U.S.B-F-OEM (Shown)

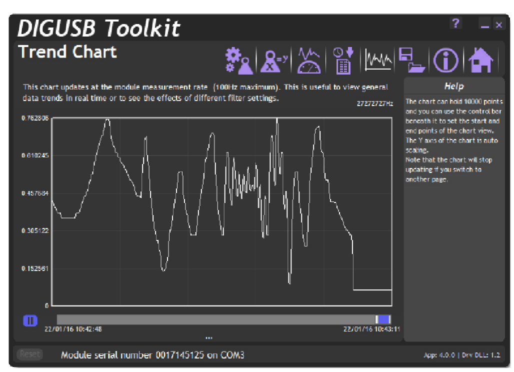


DIMENSIONS

See Drawing	1	2	3	4	5	6	7	8	9
mm	70.5	74.5	51.0	20.0	54.5	40	4	8	Ø 4.2
in	2.78	2.93	2.01	0.79	2.15	1.6	0.2	0.3	Ø 0.17

SOFTWARE

- XP, Vista, Win 7, 8, 10



FORCE MEASUREMENT SOLUTIONS.

DMA2 DIN RAIL MOUNT SIGNAL CONDITIONER (U.S. & METRIC)

FEATURES & BENEFITS

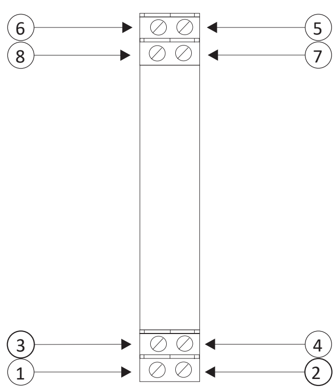
- 10-28 VDC power
- U.S.er selectable analog output ±10V, ±5V or 4-20 mA
- Selectable full scale input range 5-50mV
- DIN rail mountable

SPECIFICATIONS

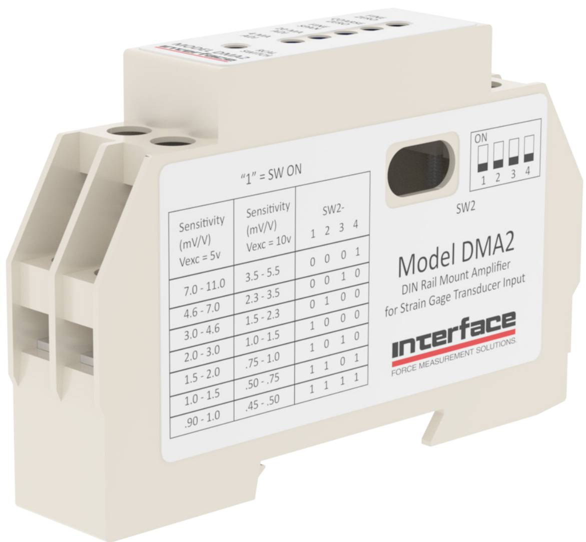
EXCITATION		
Excitation Voltage – VDC		5-10
Excitation Current – mA MAX		30
PERFORMANCE		
Output 1 – VDC		±5 or ±10 Full Scale Bipolar Jumper Selectable
Output 2 – mA		4-20 Full Scale Unipolar
Input Range – mV FS		5 to 50 Coarse & Fine AdjU.S.t
Dynamic Response – Hz		DC to 1000
Zero Offset Range – % FS		±50 Output Coarse & Fine AdjU.S.t
Nonlinearity – %FS		0.01
Span Temperature Coefficient – % / °F Max		0.004
Zero Temperature Coefficient – µV / °F Max		0.5
ENVIRONMENTAL		
Operating Temperature	ºC	0 to +70
	ºF	+32 to +158
MECHANICAL		
Mounting – mm		35 DIN Rail
POWER		
DC – VDC		10-28

WIRING DIAGRAM

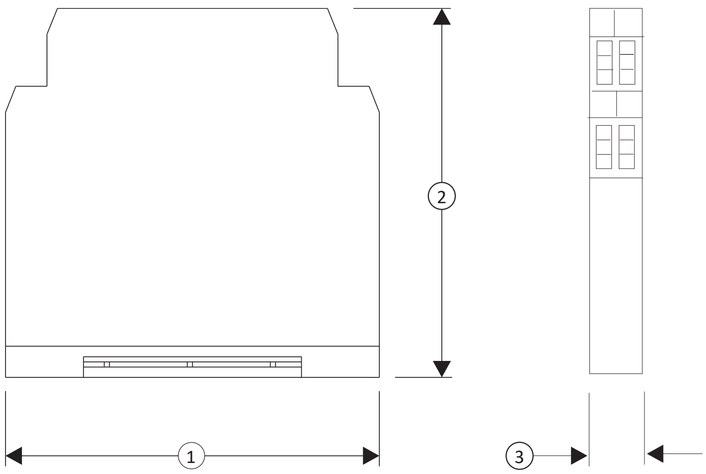
1	Ground
2	Vsupply (10-28VDC)
3	Iout (4-20mA)
4	Vout (±5 or ±10V)
5	- Excitation
6	+ Excitation
7	- Signal
8	+ Signal



STANDARD CONFIGURATION



MODEL DMA2 (Shown)



DIMENSIONS

1		2		3	
in	mm	in	mm	in	mm
3.9	99.1	2.3	58.4	0.7	17.8

FORCE MEASUREMENT SOLUTIONS.

INF-U.S.B2 SINGLE CHANNEL U.S.B INTERFACE MODULE (U.S. &

FEATURES & BENEFITS

- Easy U.S.B connection to load and torque transducers
- Up to 5000 sample/second
- Graphing and logging software included
- 16-bit resolution
- Up to 500 samples/seconds
- Data logged into MS Excel compatible CSV file format
- Shunt calibration trigger via software
- Works with mV/V, ±5VDC and 4-20mA output transducers
- Environmentally sealed to IP67 (SI-U.S.B IP40)

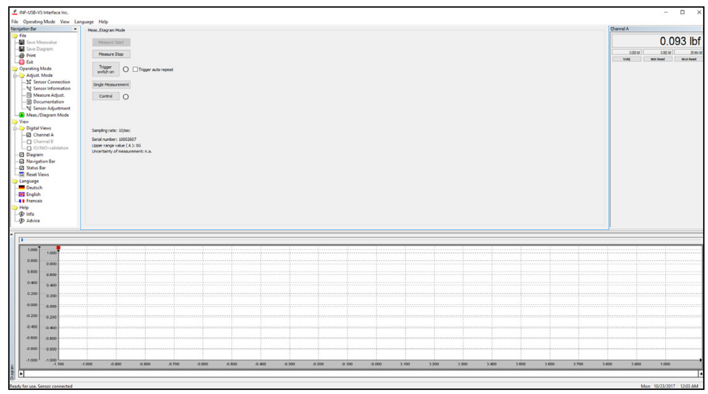
SPECIFICATIONS

POWER			
From U.S.B – VDC, mA			5,350
PERFORMANCE			
Measuring Rate:	Internal Sample Rate/sec		5000
	Software Selectable/min – /sec		1 to 2500
Temperature Drift		°C	4 counts/(+10)
		°F	4 counts/(+50)
Nonlinearity – %			0.1
Accuracy – %			0.1
Zero Point – counts			0
ENVIRONMENTAL			
Nominal Temperature Range		°C	+10 to +40
		°F	+50 to +104
Operating Temperature Range		°C	0 to +50
		°F	+32 to +122
Storage Temperature Range		°C	-10 to +70
		°F	+14 to +158
ENVIRONMENTAL			
Material			Alluminum

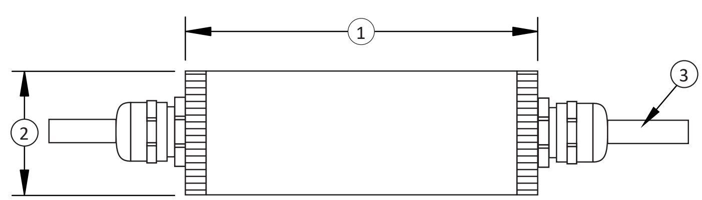
STANDARD CONFIGURATION

INF-U.S.B2 (Shown)

SOFTWARE



- Windows XP, Vista 7, 8 or 10
- System includes U.S.B connection to computer and software



DIMENSIONS

1		2		3	
mm	in	mm	in	mm	in
101.6	4.00	Ø25.4	Ø0.98	5	196.8

INPUT

AVAILABLE INPUT RANGES			EXCITATION TO SENSOR	INPUT RESISTANCE	AVAILABLE CONFIGURATIONS
Range	Input	Counts			Single Channel
A	±5 V	±25,000	12V, 80 mA	1.3 MΩ	INF-U.S.B2-A
B	4-20 mA	20,000	12V, 80 mA	62 Ω	INF-U.S.B2-B
C	±4.5 mV/V	±30,000	4V, 20 mA	200 GΩ	INF-U.S.B2-C
D	±3 mV/V	±30,000	4V, 20 mA	200 GΩ	INF-U.S.B2-D

ISG ISOLATED DIN RAIL MOUNT SIGNAL CONDITIONER

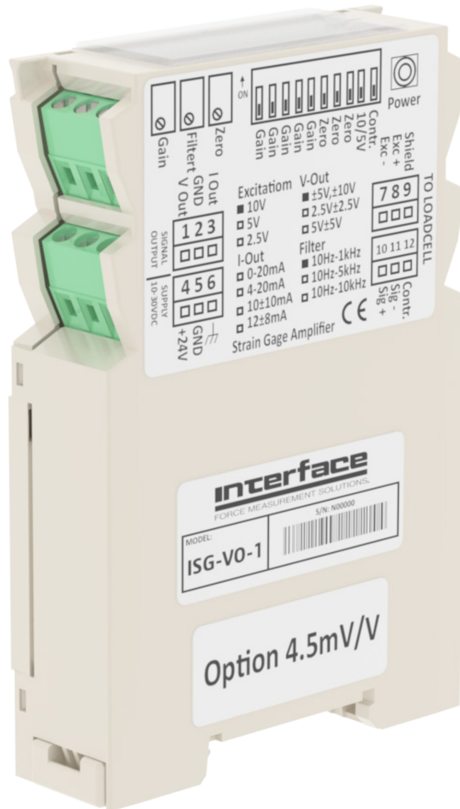
FEATURES & BENEFITS

- High Accuracy
- ±5 or ±10 VDC Analog Output (4-20mA Optional)
- 10 to 30 VDC Supply Voltage
- Accepts inputs up to 4.5mV/V
- 1 Hz to 1 kHz adjU.S.table filter (up to 10kHz optional)
- Space saving narrow hoU.S.ing per DIN EN 50022
- Isolated power supply

SPECIFICATIONS

POWER		
DC – VDC		10-30
Ripple – %		<10
Current – V < mA		10 <200 / 24 <120
FU.S.e – mA		Self Re-Setting 500
Isolation		Galvanic from Output and Measurement circuits
EXCITIATION		
Voltage – VDC(V)		10 (Option 5)
Temperature Coefficient – ppm/K		25
Current – mA (mA @ V)		90 (60 @ 5)
PERFORMANCE		
Output – V < mA		±5, ±10 <2
Ripple – mV		< 20
Input Range – mV/V		0.3 to 4.5 Switch Selectable
Input Resistance		1.00E+10
Max Bandwidth – Hz		1000
Filter – 3dB – Hz		10 to 1000 Potentiometer AdjU.S.table
Offset		Up to 50% course and fine adjU.S.t
Nonlinearity – %		< 0.02
Span Temperature Coefficient – %/ K		< 0.02/10
Zero Temperature Coefficient – %/ K		< 0.02/10
ENVIRONMENTAL		
Operating Temperature	°C	0 to +60
	°F	+32 to +140
MECHANICAL		
Dimensions - W x H x D	mm	23.1 x 111.0 x 75.9
	in	0.91 x 4.37 x 2.99
Protection Level		IP20
Electrical Connections		Screw Terminal
DIN Rail		DIN EN 50022

STANDARD CONFIGURATION



MODEL ISG-VO-1 (Shown)

OPTIONS

- Outputs: 5±5V, 4-20mA, 0-20mA, 12±8mA, 10±10mA
- Increased dynamics: 5kHz-3 dB, 10kHz-3 dB
- Excitation: 5V ≤60MA

CE

JUNCTION BOXES (U.S. & METRIC)

FEATURES & BENEFITS

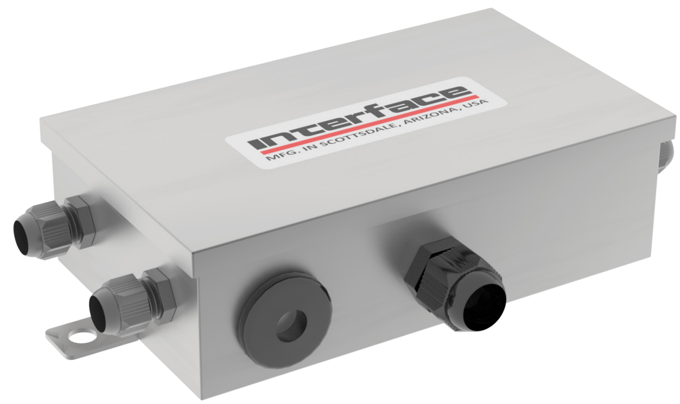
- A convenient method for Wiring multiple load cells to a single indicator
- Commonly U.S.ed in multi-load cell weighing applications
- Ability to coil excess cable inside the box

The JB104SS junction box model is designed to connect and trim up to four load cells per board. It may also be U.S.ed in combination with additional juction boxes through the U.S.e dof an expansion port on the main board to connect multiple junction boxes thU.S. allowing the summing of more than four load cells.

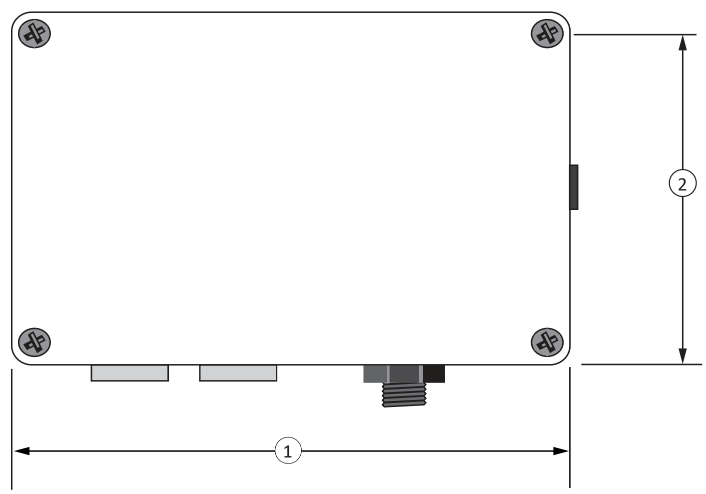
In its most basic form a junction box provides a convenient method for Wiring multiple load cells to a single indicator. Junction boxes are commonly U.S.ed in weighing applications where a tank or scale is supported by more than one load cell. The individual load cell cables are wired into the junction box and then a single cable connects the junction box to the instrumentation.

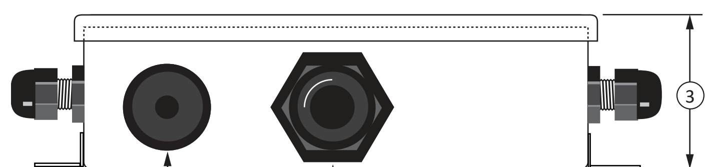
The JB104SS is a small 4 x 6.5 x 1.75 in (102 x 165 x 44.5 mm) stainless steel NEMA 4 rated box suitable for installations where space is limited. Standard configuration is for up to 4 load cells and provides three trim ranges; no trim, 10% and 30%. Spring clips are U.S.ed for the load cell connections.

STANDARD CONFIGURATION



MODEL JB104SS (Shown)





DIMENSIONS

1		2		3	
in	mm	in	mm	in	mm
5.75	146	4.00	102	1.60	40.6

FORCE MEASUREMENT SOLUTIONS

LCT-1 ULTIMATE LOAD CELL TEST INSTRUMENT (U.S. & METRIC)

FEATURES & BENEFITS

- ContinuoU.S. signal readout provides checking of linearity and repeatability
- U.S.er friendly: fully test the load cell without intervention
- Alphanumeric display: 16 x 2 lines
- Rugged ABS enclosure with rubberized over
- IndU.S.trial 8-pin screw connector
- Weight: 250 g

The LCT-1 Ultimate provides fast and accurate testing on all load cells to ensure proper operating performance. This instrument is battery-powered and comes with a rubberized enclosure for drop protection. U.S.ing 4-AA batteries, it's completely portable and the indU.S.trialized connector allows for any 4 or 6 wire load cell to be connected.

PRODUCT DESCRIPTION

The LCT-1 Ultimate is a hand-held device that is specifically designed to fully troubleshoot strain-gage based load cells. It provides several tests that indicate bridge resistance & integrity, overload, and insulation resistance - which can indicate moisture or chemical contamination into the load cell.

SPECIFICATIONS

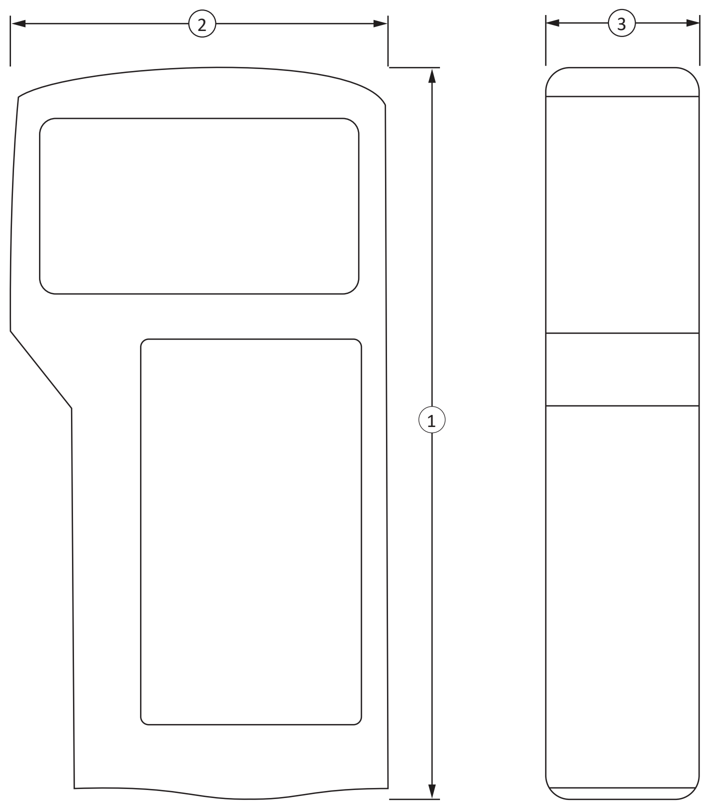
A/D conversion – bit	16
Bridge test – VDC	1.25
High resistance test – VDC	10
Input and output resistance – Ω	5k at 0.5 resolution & ±0.5 accuracy
Sense resistance (for 6 wire L/C) – Ω	Up to 500 at 0.1 resolution
Insulation resistance – GΩ – % – MΩ	5 at 10 accuracy (min. >10)
Load cell output in percentage of full scale (input resistance > 175 Ω) – %	±250 at 0.01 resolution and 0.1 accuracy
Gain adjU.S.tment – mv/V	0.1 to 5 in steps of 0.01

DIMENSIONS

1		2		3	
mm	in	mm	in	mm	in
150	5.9	80	3.1	28	1.1

STANDARD CONFIGURATION

MODEL LCT-1 (Shown)



Interface
FORCE MEASUREMENT SOLUTIONS.

SGA AC/DC POWERED SIGNAL CONDITIONER (U.S. & METRIC)

FEATURES & BENEFITS

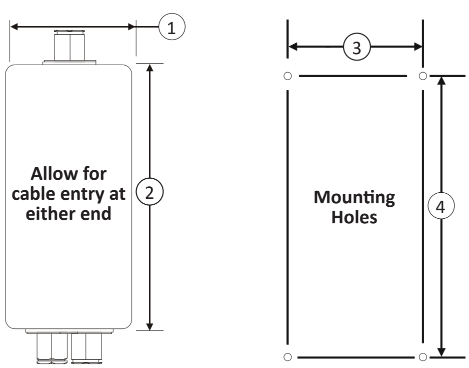
- U.S.er selectable analog output ±10V, ±5V, 0-10V, 0-5V, 0-20 mA, 4-20 mA
- 110 VAC, 220 VAC OR 18-24 VDC power
- Switch selectable filtering 1 Hz to 5 kHz
- Single channel powers up to 4 transducers
- Selectable full scale input range 0.06 to 30 mV/V
- Switch selectable offset ±70% FS
- Sealed ABS enclosure

STANDARD CONFIGURATION

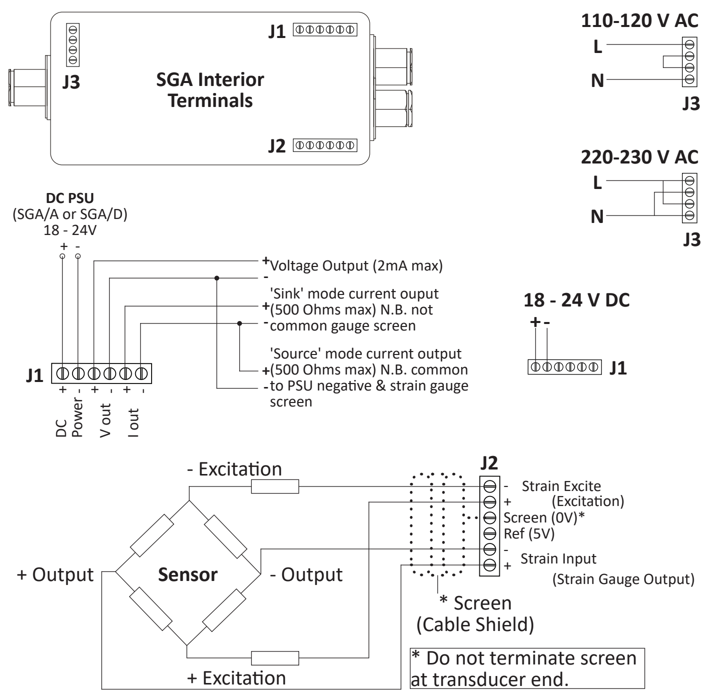
MODEL SGA (Shown)

SPECIFICATIONS

POWER		
AC – VAC, Hz		110, 60 or 220, 50
DC – VDC		18-24
EXCITATION		
Voltage – VDC ± %		10 ±5
Current – mA		118
PERFORMANCE		
Output	V	±10, ±5 Bipolar 0-5, 0-10 Unipolar
	mA	0-20, 4-20 Unipolar or Bipolar
Input Range – mV/V		±0.06 to ±30
Max Bandwidth – kHz		6
Filter – Hz		1 to 5K
Offset – %FS		±70
Nonlinearity – %FS		0.03
Span Temperature Coefficient – % / °F Max		0.004
Zero Temperature Coefficient – µV / °F Max		0.5
ENVIRONMENTAL		
Operating Temperature	°F	+32 to +122
	°C	0 to +50
Storage Temperature	°F	-4 to +158
	°C	-20 to +70
Dimensions – L x W x H	in	6.3 X 3.1 X 2.2
	mm	160 x 79 x 56
Enclosure		Sealed ABS case, Compression cable seals



WIRING DIAGRAM



ACCESSORIES

- AC Power Cord (PWRCRD-SGA-110)

DIMENSIONS

1		2		3		4		Depth	
mm	in	mm	in	mm	in	mm	in	mm	in
80	3.15	160	6.30	50	1.97	148	5.83	55	2.16

Catalog 2019 06-15-2020

FORCE MEASUREMENT SOLUTIONS.

SI-U.S.B DUAL CHANNEL U.S.B INTERFACE MODULE (U.S. &

FEATURES & BENEFITS

- Easy U.S.B connection to load and torque transducers
- Up to 5000 sample/second
- Graphing and logging software included
- 16-bit resolution
- Data logged into MS Excel compatible CSV file format
- Shunt calibration trigger via software
- Works with mV/V, ±5VDC and 4-20mA output transducers
- 2 Channel

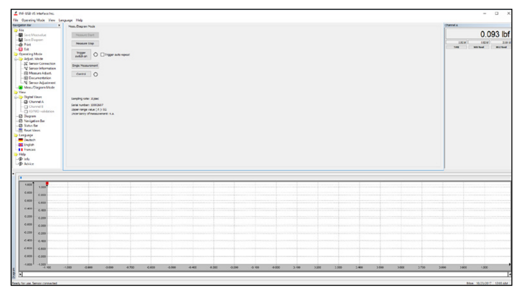
STANDARD CONFIGURATION

SI-U.S.B (Shown)

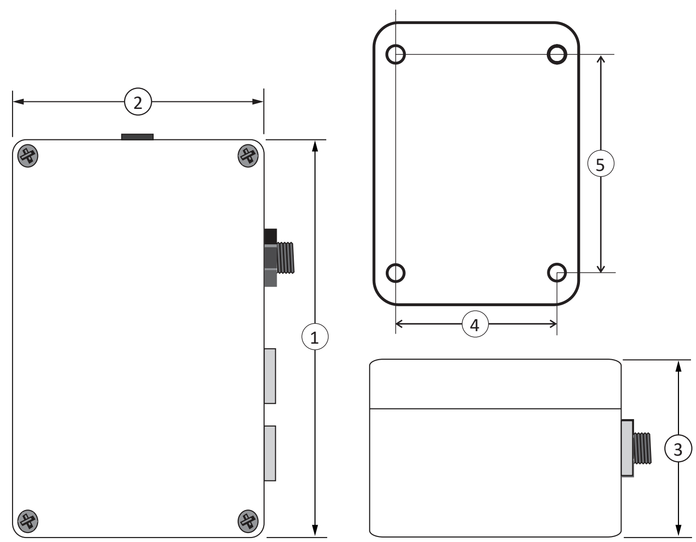
SPECIFICATIONS

POWER		
AC Adapter Supplied – VDC		24
PERFORMANCE		
Measuring Rate	Internal Sample Rate/sec	5000
	Software Selectable/min – /sec	1 to 2500
Temperature Drift	°C	4 counts/(+10)
	°F	4 counts/(+50)
Nonlinearity – %		0.1
Accuracy – %		0.1
Zero Point – counts		0
ENVIRONMENTAL		
Nominal Temperature Range	°C	+10 to +40
	°F	+50 to +104
Operating Temperature Range	°C	0 to +50
	°F	+32 to +122
Storage Temperature Range	°C	-10 to +70
	°F	+14 to +158

SOFTWARE



- Windows XP, Vista 7, 8 or 10
- System includes U.S.B connection to computer and software
- SI-U.S.B includes two mating connectors



INPUT

AVAILABLE INPUT RANGES			EXCITATION TO SENSOR	INPUT RESISTANCE	AVAILABLE CONFIGURATIONS
Range	Input	Counts			Dual Channel*
A	±5 V	±25,000	12V, 200 mA	1.3 MΩ	SI-U.S.B-AA
B	4-20 mA	20,000	12V, 200 mA	62 Ω	SI-U.S.B-BB
C	±4.5 mV/V	±30,000	5V, 20 mA	200 GΩ	SI-U.S.B-CC
D	± 3 mV/V	±30,000	5V, 20 mA	200 GΩ	SI-U.S.B-DD

Mixed ranges also available. Example: **SI-U.S.B-AD.*

DIMENSIONS

1		2		3		4		5	
mm	in	mm	in	mm	in	mm	in	mm	in
124.46	4.90	78.74	3.100	55.88	2.200	52	2.05	113	4.45

Notes:

Wireless Telemetry System

Wireless

Acquisition Module

Repeater Module

Telemetry Antenna

Base Station

ModbU.S.

ASCII Serial Output

LED Display

Wireless Telemetry Printer

Remote Data Collection

Relay Output Receiver Module

Wind Speed Transmitter Module

FORCE MEASUREMENT SOLUTIONS

WTS-AM-1E WIRELESS STRAIN BRIDGE TRANSMITTER MODULE

The WTS-AM-1E transmitter connects to strain bridge transducers such as load cells, torque sensors, strain gauges and pressure modules and forms part of the WTS modular telemetry system. The data transmitted by the WTS-AM-1E can be received by multiple WTS receivers that include displays, handheld readers, analog outputs, relay modules and computer interfaces.

WTS transmitters have been designed for battery operation and support an ultra low-power sleep mode whilst offering class leading wireless coverage and range. Configurable transmission rates from once per day to 200 per second cope with a wide range of measurement and monitoring applications. A choice of enclosures enabling battery connection, field connectivity and environmental sealing up to IP67 ensure these modules provide a flexible solution to your wireless sensor requirements.

The WTS-AM-1E provides 5 V excitation to drive transducer loads down to 85 ohms. This transmitter is highly accurate, low noise and uses up to nine point linearization giving quality measurements from a wide range of strain bridge transducers.

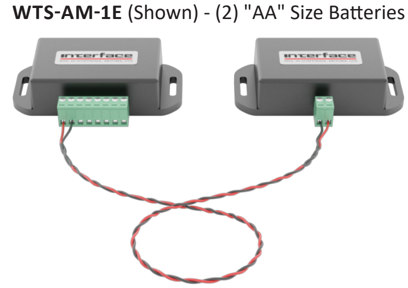
SPECIFICATIONS

MEASUREMENT SPECIFICATIONS		
Strain Gauge Excitation System		4-wire
Strain Gauge Excitation – VDC		5
Strain Gauge Resistance (min) – Ω		85
Strain Gauge Sensitivity (max) – mV/V		±4.5
Offset Temperature Stability (max) – ppm/ºC		4
Gain Temperature Stability (max) – ppm/ºC		5
Nonlinearity Before Linearization (max) – ppm of FR		25
Internal Resolution/Bits		16,000,000 / 24
Noise Free Resolution at 1 Sample Per Second		400,000 / 18.75
Transmission Rates – Hz		From 5 to 1
BATTERY LIFE		
Based on transmitting results at 3 per second , 350R strain bridge		
Pair AA Cells Constantly On – weeks		3
Pair AA Cells 12 Sessions Per Day of 5 Mins – years		2
Pair DD Cells Constantly On – months		3.5
Pair DD Cells 12 Sessions Per Day of 5 mins – years		5
POWER SUPPLY		
WTS-AM-1E – VDC		2.1 to 3.6
WTS-AM-1E-D – VDC		5 to 18
RADIO		
Radio Type		License exempt transceiver
Radio Frequency – GHz		2.4
Transmit Power – mW		10
Range	m	Up to 800
	ft	Up to 2,625
ENVIRONMENTAL		
Operating Temperature Range	°C	-20 to 55
	°F	-4 to 131
Storage Temperature Range (no batteries)	°C	-40 to 85
	°F	-40 to 185
Maximum Humidity – %		95 non-condensing
IP Rating (WTS-AM-1F & WTS-AM-1-D)		IP67/Nema4

STANDARD CONFIGURATION

WTS-AM-1E-D (Shown) - (2) "D" Size Batteries

WTS-AM-1E (Shown) - (2) "AA" Size Batteries



WTS-AM-4 (Shown) - (2) "AAA" Size Batteries with BB1

FEATURES & BENEFITS

- Simple wireless configuration and calibration
- Wireless range up to 800 m (2,625 ft)
- Low power mode for long battery life
- Free Visualization software

INDUSTRY SOLUTIONS

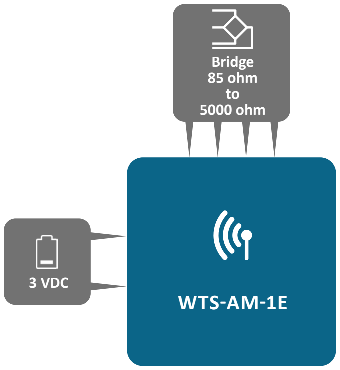
- **Construction**
  - Monitoring tension & compression on shoring struts
  - Crane/Under Hook Scales
- **Automotive & Vehicle**
  - Torque measurement on rotating shaft
  - Wheel balance in high performance cars

OPTIONS

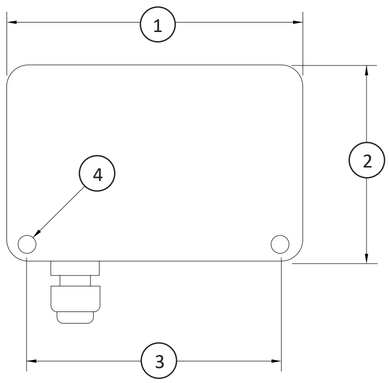
WTS-AM-1E-D
Wireless strain bridge transmitter module in IP67 enclosure supporting two D batteries or external power supply
WTS-AM-1E
Wireless strain bridge transmitter module in IP67 enclosure for two AA batteries
WTS-AM-4
Wireless strain bridge transmitter module in miniature IP50 enclosure

interface
FORCE MEASUREMENT SOLUTIONS.

WTS-AM-1E WIRELESS STRAIN BRIDGE TRANSMITTER MODULE



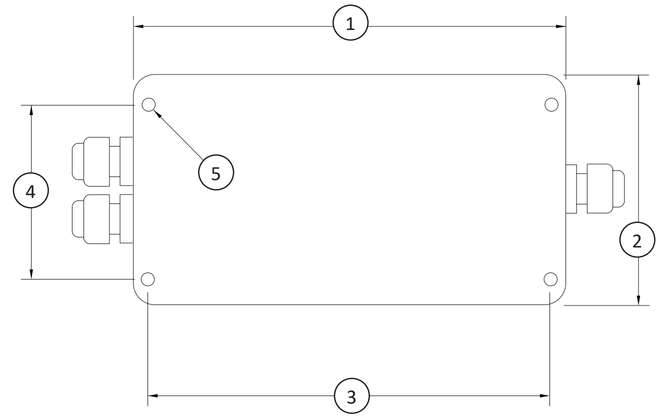
ELECTRICAL



WTS-AM-1E (2) "AA" Size Batteries

DIMENSIONS

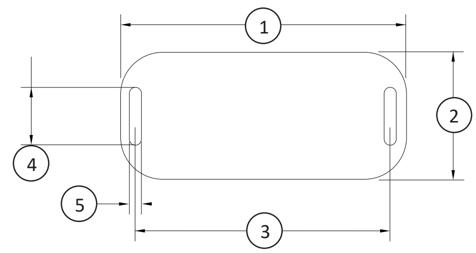
See Drawing	Metric (mm)	U.S. (in)
(1)	80	3.1
(2)	62	2.4
(3)	66.5	2.6
(4)	Ø4.8	Ø0.2
Height	34	1.3



WTS-AM-1F-D (2) "D" Size Batteries

DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	164	6.5
(2)	84	3.3
(3)	148	5.8
(4)	50	2.0
(5)	Ø4.5	Ø0.2
Height	57	2.2



WTS-AM-4 (2) "AAA" Size Batteries with BB1

DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	76	3
(2)	35	1.4
(3)	68	2.7
(4)	15	0.6
(5)	3.2	0.1
Height	20	0.8

WTS-AM-1F WIRELESS STRAIN BRIDGE TRANSMITTER MODULE FOR FAST MEASUREMENTS

The WTS-AM-1F transmitter connects to strain bridge transducers such as load cells, torque sensors, strain gauges and pressure modules and forms part of the WTS modular telemetry system. The data transmitted by the WTS-AM-1F can be received by multiple WTS receivers that include handheld readers, analog outputs and computer interfaces.

WTS transmitters have been designed for battery operation and support an ultra low-power sleep mode whilst offering class leading wireless coverage and range. A choice of enclosures enabling battery connection, field connectivity and environmental sealing up to IP67 ensure these modules provide a flexible solution to your wireless sensor requirements.

The WTS-AM-1F is a 2000 samples per second (fixed) version of the WTS-SA for high speed monitoring. WTS-AM-1F provides 5 V excitation to drive transducer loads down to 85 ohms. This transmitter is highly accurate, low noise and outputs in nV/V giving quality measurements from a wide range of strain bridge transducers.

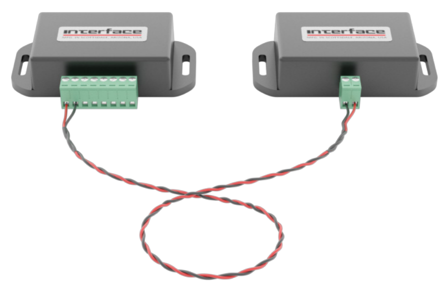
SPECIFICATIONS

MEASUREMENT SPECIFICATIONS		
Strain Gauge Excitation System		4-wire
Strain Gauge Excitation – VDC		5
Strain Gauge Resistance (min) – Ω		85
Strain Gauge Sensitivity (max) – mV/V		±4.5
Offset Temperature Stability (max) – ppm/ºC		4
Gain Temperature Stability (max) – ppm/ºC		5
Nonlinearity Before Linearization (max) – ppm of FR		25
Internal Resolution/Bits		16,000,000/24
Noise Free Resolution at 1 Sample Per Second		8,000/13
Transmission Rates – Hz		2,000
BATTERY LIFE		
Based on transmitting results at 3 per second , 350R strain bridge		
Pair AA Cells Constantly On – hours		30
Pair AA Cells 12 Sessions Per Day of 5 Mins – days		30
Pair D Cells Constantly On – days		5.5
Pair D Cells 12 Sessions Per Day of 5 mins – months		4.5
POWER SUPPLY		
WTS-AM-1F – VDC		2.1 to 3.6
WTS-AM-1F-D – VDC		5 to 18
RADIO		
Radio Type		License exempt transceiver
Radio Frequency – GHz		2.4
Transmit Power – mW		10
Range	m	Up to 800
	ft	Up to 2,625
ENVIRONMENTAL		
Operating Temperature Range	°C	-20 to 55
	°F	-4 to 131
Storage Temperature Range (no batteries)	°C	-40 to 85
	°F	-40 to 185
Maximum Humidity – %		95 non-condensing
IP Rating (WTS-AM-1F & WTS-AM-1F)		IP67/Nema4

STANDARD CONFIGURATION

WTS-AM-1F-D (Shown) - (2) "D" Size Batteries

WTS-AM-1F (Shown) - (2) "AA" Size Batteries



WTS-AM-4F (Shown) - (2) "AAA" Size Batteries with BB1

FEATURES & BENEFITS

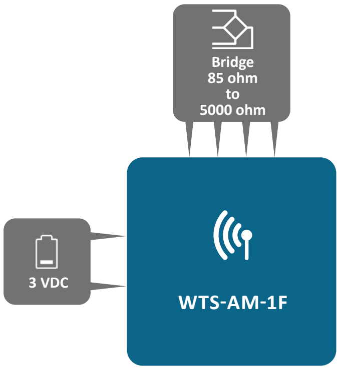
- Ultra-fast update rate of 2000 per second
- Wireless range up to 800 m (2,625 ft)
- Low power mode for long battery life
- Free Visualization software

OPTIONS

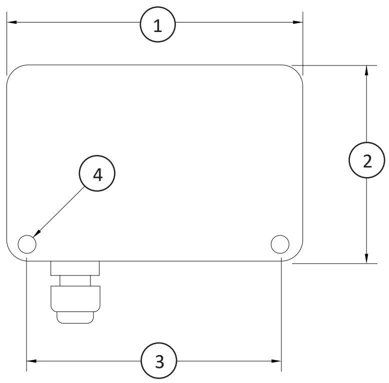
WTS-AM-1F-D
Wireless strain bridge fast transmitter module in IP67 enclosure supporting two D batteries or external power supply
WTS-AM-1F
Wireless strain bridge fast transmitter module in IP67 enclosure for two AA batteries
WTS-AM-4F
Wireless strain bridge fast transmitter module in miniature IP50 enclosure

FORCE MEASUREMENT SOLUTIONS.

WTS-AM-1F WIRELESS STRAIN BRIDGE TRANSMITTER MODULE FOR FAST MEASUREMENTS



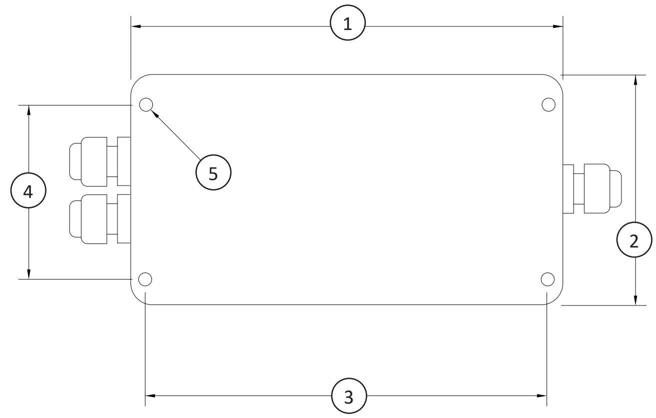
ELECTRICAL



WTS-AM-1F (2) "AA" Size Batteries

DIMENSIONS

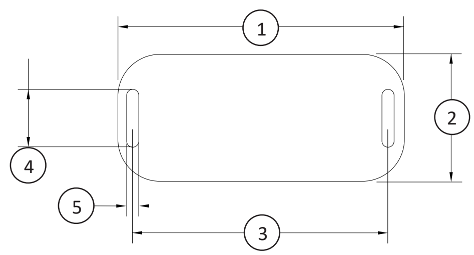
See Drawing	Metric (mm)	U.S. (in)
(1)	80	3.1
(2)	62	2.4
(3)	66.5	2.6
(4)	Ø4.8	Ø0.2
Height	34	1.3



WTS-AM-1F-D (2) "D" Size Batteries

DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	164	6.5
(2)	84	3.3
(3)	148	5.8
(4)	50	2.0
(5)	Ø4.5	Ø0.2
Height	57	2.2



WTS-AM-4F (2) "AAA" Size Batteries with BB1

DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	76	3
(2)	35	1.4
(3)	68	2.7
(4)	15	0.6
(5)	3.2	0.1
Height	20	0.8

WTS-AM-2 WIRELESS VOLTAGE SENSOR TRANSMITTER

The WTS-AM-2 transmitter module connects to 0-10 V conditioned sensors such as pressure, %RH, inclinometer, accelerometer, depth, vibration, Temperature and flow. It forms part of the WTS modular telemetry system. The data transmitted by the WTS-AM-2 can be received by multiple WTS receivers that include displays, handheld readers, analog outputs, relay modules and computer interfaces.

WTS transmitters have been designed for battery operation and support an ultra low-power sleep mode whilst offering class leading wireless coverage and range. Configurable transmission rates from once per day to 200 per second cope with a wide range of measurement and monitoring applications. A choice of enclosures enabling battery connection, field connectivity and environmental sealing up to IP67 ensure these modules provide a flexible solution to your wireless sensor requirements.

The WTS-AM-2 provides 5 V excitation to power external sensors. This transmitter provides up to nine point linearization giving quality measurements from a wide range of sensors.

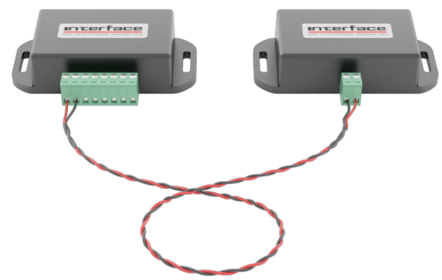
SPECIFICATIONS

MEASUREMENT SPECIFICATIONS		
Input Range – VDC		0 to 10
Calibrated Range – VDC		0 to 10
Input Impedance – Ω		100,000
Input Calibration Accuracy – %FR		0.1
Offset Temperature Stability (max) – ppm/°C		0.5
Gain Temperature Stability (max) – ppm/°C		50
Nonlinearity Before Linearization (max) – ppm of FR		25
Internal Resolution/Bits		16,000,000/24
Noise Free Resolution/Bits at 1 Sample Per Second		15,000/13.75
Transmission Rates – ms to day		From 5 to 1
Excitation Available – VDC @ mA		5 @ 50
BATTERY LIFE		
Transmitting results at 3 per second , no excitation required		
Pair AA Cells Constantly On – month		1
Pair AA Cells 12 Sessions Per Day of 5 Mins – years		2
Pair D Cells Constantly On – months		4.5
Pair D Cells 12 Sessions Per Day of 5 mins – years		>9
POWER SUPPLY		
WTS-AM-2 – VDC		2.1 to 3.6
WTS-AM-2-D – VDC		5 to 18
RADIO		
Radio Type		License exempt transceiver
Radio Frequency – GHz		2.4
Transmit Power – mW		10
Range	m	Up to 800
	ft	Up to 2,625
ENVIRONMENTAL		
Operating Temperature Range	°C	-20 to 55
	°F	-4 to 131
Storage Temperature Range (no batteries)	°C	-40 to 85
	°F	-40 to 185
Maximum Humidity – %		95 non-condensing
IP Rating (WTS-AM-2 & WTS-AM-2-D)		IP67/Nema4

STANDARD CONFIGURATION

WTS-AM-2-D (Shown) - (2) "D" Size Batteries

WTS-AM-2 (Shown) - (2) "AA" Size Batteries



WTS-AM-5 (Shown) - (2) "AAA" Size Batteries with BB1

FEATURES & BENEFITS

- Simple wireless configure and calibration
- Wireless range up to 800 m (2,625 ft)
- Low power mode for long battery life
- Free Visualization software
- Ideal for conditioned transducers

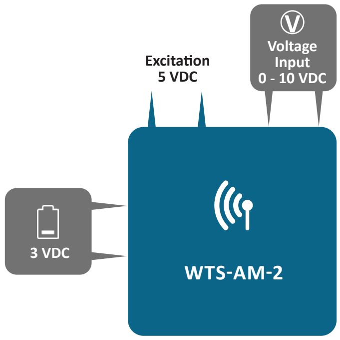
OPTIONS

WTS-AM-2-D
Wireless 0-10 V transmitter module in IP67 enclosure supporting two D batteries or external power supply

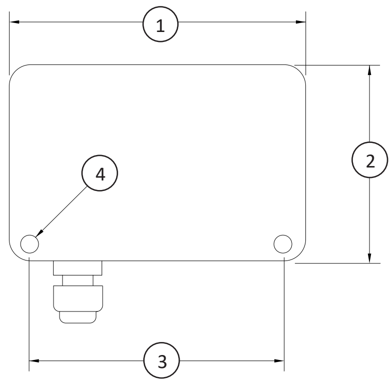
WTS-AM-2
Wireless 0-10 V transmitter module in IP67 enclosure for two AA batteries

WTS-AM-5
Wireless 0-10 V transmitter module in miniature IP50 enclosure

WTS-AM-2 WIRELESS VOLTAGE SENSOR TRANSMITTER



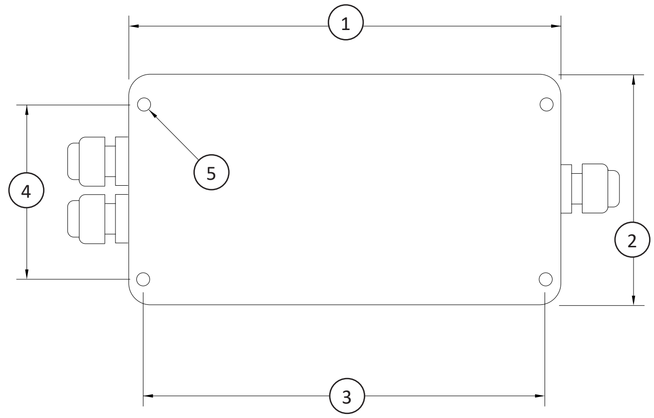
ELECTRICAL



WTS-AM-2 (2) "AA" Size Batteries

DIMENSIONS

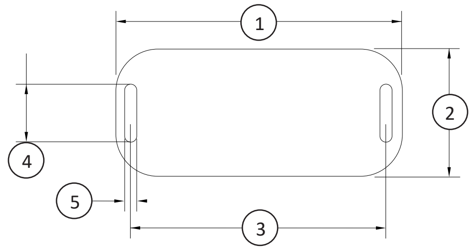
See Drawing	Metric (mm)	U.S. (in)
(1)	80	3.1
(2)	62	2.4
(3)	66.5	2.62
(4)	Ø4.8	Ø0.19
Height	34	1.3



WTS-AM-2-D (2) "D" Size Batteries

DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	164	6.5
(2)	84	3.3
(3)	148	5.8
(4)	50	2.0
(5)	Ø4.5	Ø0.2
Height	57	2.2



WTS-AM-5 (2) "AAA" Size Batteries with BB1

DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	76	3
(2)	35	1.4
(3)	68	2.7
(4)	15	0.6
(5)	3.2	0.1
Height	20	0.8

interface
FORCE MEASUREMENT SOLUTIONS.

WTS-AM-3 WIRELESS 4-20 mA TRANSMITTER MODULE

The WTS-AM-3 transmitter module connects to 4-20 mA conditioned sensors such as pressure, %RH, inclinometer, accelerometer, depth, vibration, Temperature and flow. It forms part of the WTS modular telemetry system. The data transmitted by the WTS-AM-3 can be received by multiple WTS receivers that include displays, handheld readers, analog outputs, relay modules and computer interfaces.

WTS transmitters have been designed for battery operation and support an ultra low-power sleep mode whilst offering class leading wireless coverage and range. Configurable transmission rates from once per day to 200 per second cope with a wide range of measurement and monitoring applications. A choice of enclosures enabling battery connection, field connectivity and environmental sealing up to IP67 ensure these modules provide a flexible solution to your wireless sensor requirements.

The WTS-AM-3 provides 5 V excitation to power external sensors. This transmitter provides up to nine point linearization giving quality measurements from a wide range of sensors.

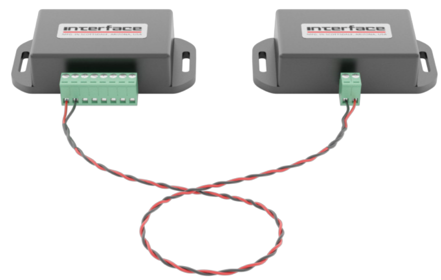
SPECIFICATIONS

MEASUREMENT SPECIFICATIONS		
Input Range – mA		0 to 20
Calibrated Range – mA		4 to 20
Input Impedance – Ω		47
Input Calibration Accuracy – %FR		0.1
Offset Temperature Stability (max) – ppm/°C		0.5
Gain Temperature Stability (max) – ppm/°C		50
Nonlinearity Before Linearization (max) – ppm of FR		25
Internal Resolution/Bits		16,000,000/24
Noise Free Resolution/Bits at 1 Sample Per Second		30,000/14.75
Transmission Rates – ms to day		From 5 to 1
Excitation Available – VDC @ mA		5 @ 50
BATTERY LIFE		
Transmitting results at 3 per second , no excitation required		
Pair AA Cells Constantly On – month		1
Pair AA Cells 12 Sessions Per Day of 5 Mins – years		2
Pair D Cells Constantly On – months		4.5
Pair D Cells 12 Sessions Per Day of 5 mins – years		>9
POWER SUPPLY		
WTS-AM-3 – VDC		2.1 to 3.6
WTS-AM-3-D – VDC		5 to 18
RADIO		
Radio Type		License exempt transceiver
Radio Frequency – GHz		2.4
Transmit Power – mW		10
Range	m	Up to 800
	ft	Up to 2,625
ENVIRONMENTAL		
Operating Temperature Range	°C	-20 to 55
	°F	-4 to 131
Storage Temperature Range (no batteries)	°C	-40 to 85
	°F	-40 to 185
Maximum Humidity – %		95 non-condensing
IP Rating (WTS-AM-3 & WTS-AM-3-D)		IP67/Nema4

STANDARD CONFIGURATION

WTS-AM-3-D (Shown) - (2) "D" Size Batteries

WTS-AM-3 (Shown) - (2) "AA" Size Batteries



WTS-AM-6 (Shown) - (2) "AAA" Size Batteries with BB1

FEATURES & BENEFITS

- Simple wireless configure and calibration
- Wireless range up to 800 m (2,625 ft)
- Low power mode for long battery life
- Free visualisation software
- Ideal for conditioned transducers

OPTIONS

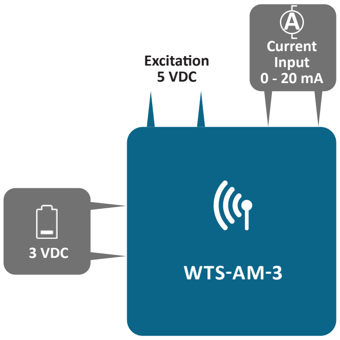
WTS-AM-3-D
Wireless 4-20 mA transmitter module in IP67 enclosure supporting two D batteries or external power supply

WTS-AM-3
Wireless 4-20 mA transmitter module in IP67 enclosure for two AA batteries

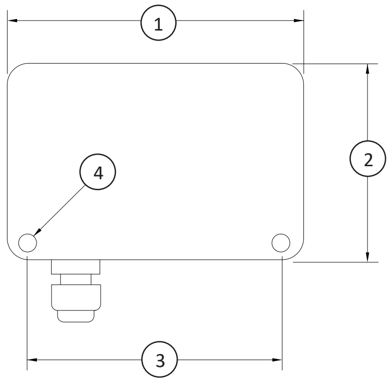
WTS-AM-6
Wireless 4-20 mA transmitter module in miniature IP50 enclosure

FORCE MEASUREMENT SOLUTIONS.

WTS-AM-3 WIRELESS 4-20 mA TRANSMITTER MODULE



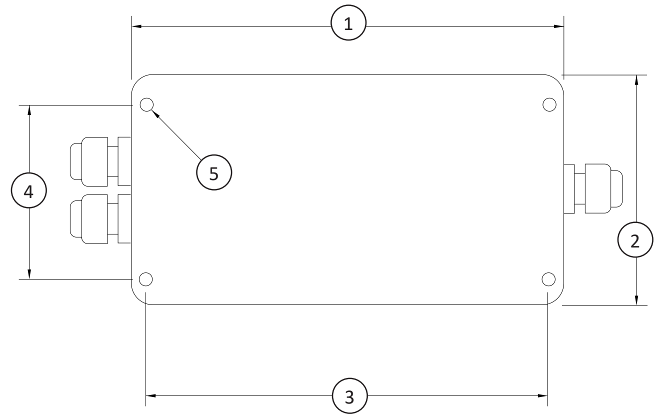
ELECTRICAL



WTS-AM-3 (2) "AA" Size Batteries

DIMENSIONS

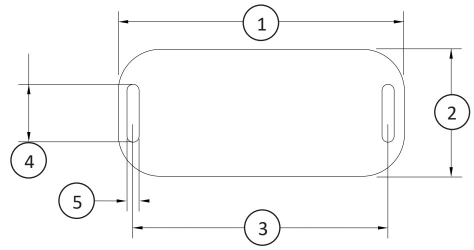
See Drawing	Metric (mm)	U.S. (in)
(1)	80	3.1
(2)	62	2.4
(3)	66.5	2.6
(4)	Ø4.8	Ø2.0
Height	34	1.3



WTS-AM-3-D (2) "D" Size Batteries

DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	164	6.5
(2)	84	3.3
(3)	148	5.8
(4)	50	2.0
(5)	Ø4.5	Ø0.2
Height	57	2.2



WTS-AM-6 (2) "AAA" Size Batteries with BB1

DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	76	3
(2)	35	1.4
(3)	68	2.7
(4)	15	0.6
(5)	3.2	0.1
Height	20	0.8

WTS-AR WIRELESS REPEATER MODULE

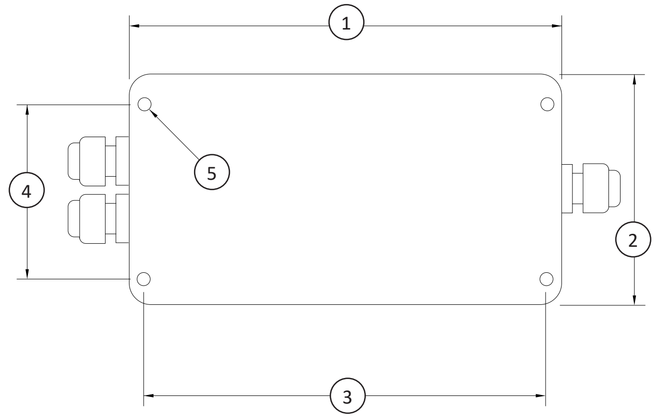
The WTS-AR is a repeater which will allow the WTS telemetry system modules to span around obstacles, increase range and coverage by retransmitting received messages.

The data sent by transmitter modules can be utilized by multiple receivers such as displays, handheld readers, analog outputs, relay modules and computer interfaces. Receivers support common indU.S.trial power supplies and are available in robU.S.t IP rated enclosures with internal antennas optimized to give outstanding coverage.

The WTS-AR is hoU.S.ed in an IP67 rated enclosure which accepts two D batteries as well as an external power supply. The repeater enables messages to be repeated once so therefore extends the achievable wireless range. Adding further repeaters to the system will increase coverage but will not further increase the range.

STANDARD CONFIGURATION

WTS-AR (Shown)



FEATURES & BENEFITS

- Extends and enhances range of WTS devices
- Allows communication around obstacles
- Improves propagation of signal

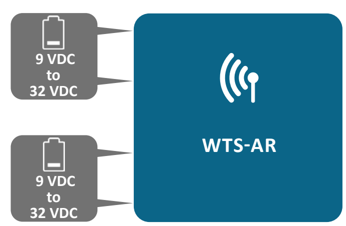
SPECIFICATIONS

BATTERY LIFE		
AR Permanently Activated (Pair D Cells) – hours		240
POWER SUPPLY		
Internal Batteries (D cells) – VDC		2.1 to 3.6
External Power Supply – VDC		5 to 18
RADIO		
Radio Type		License exempt transceiver
Radio Frequency – GHz		2.4
Transmit Power – mW		10
Range	m	Up to 800
	ft	Up to 2,625
ENVIRONMENTAL		
Operating Temperature Range	°C	-20 to 55
	°F	-4 to 131
Storage Temperature Range (no batteries)	°C	-40 to 85
	°F	-40 to 185
Maximum Humidity – %		95 non-condensing
IP Rating		IP67/Nema4

DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	164	6.5
(2)	84	3.3
(3)	148	5.8
(4)	50	2.0
(5)	Ø4.5	Ø0.2
Height	57	2.2

ELECTRICAL



Interface

FORCE MEASUREMENT SOLUTIONS

WTS-ANTA / ANTB / ANTC TELEMETRY ANTENNA OPTIONS

The WTS-ANTA, WTS-ANTB and WTS-ANTC can be integrated with any of the WTS modules which are factory fitted with UFL antenna connectors (such as the external antenna Options of the acquisition modules e.g. WTS-AM-1, WTS-AM-2, WTS-AM-3). Options also exist for antennas to be fitted to other modules within the WTS range.

The WTS-ANTA is a PCB antenna designed to be fitted inside a plastic enclosure. Cable length 100 mm (4 in) UFL-UFL.

The WTS-ANTB is a whip antenna with a fixed 90 degree elbow designed for mounting externally. Cable length 100 mm (4 in) UFL – Reversed SMA. IP67 rated.

The WTS-ANTC is a whip antenna with a variable angled elbow for mounting externally. Cable length 100 mm (4 in) UFL – Reversed SMA. IP67 rated.

The WTS-ANTD is a 'puck' antenna designed for mounting externally. It is suitable for applications requiring a low physical profile and high gain. Fitted with a 0.6 m (2 ft) cable, RPSMA connector and supplied with a 100 mm (4 in) RPSMA to UFL adaptor cable. IP69K rated.

The WTS-ANTE is a 'puck' antenna designed for mounting externally. It is suitable for applications requiring a low physical profile and high gain. Fitted with a 100 mm (4 in) cable and UFL connector with an environmental rating of IP69K.

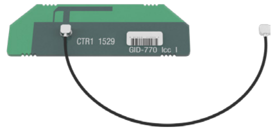
FEATURES & BENEFITS

- 4 different versions (PCB, fixed, variable, puck)
- Offers flexibility to OEM installers
- Surface & bulkhead Options

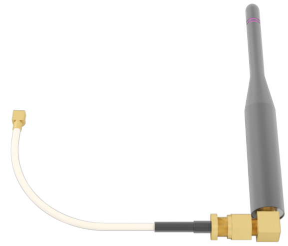
SPECIFICATIONS

Approved telemetry antenna Options for varioU.S. T24 modules		
External antennas are weatherized		
UFL antenna connectors		
ENVIRONMENTAL		
Operating Temperature Range	°C	-20 to 85
	°F	-4 to 185
Storage Temperature Range	°C	-40 to 85
	°F	-40 to 185
Maximum Humidity – %		95 non-condensing
CE Environmental Approvals		European EMC Directive 2004/108/EC
		Low Voltage Directive 2006/95/EC

STANDARD CONFIGURATION



WTS-ANTA (Shown)



WTS-ANTB (Shown)

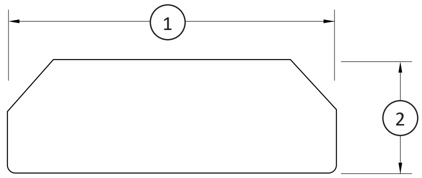
WTS-ANTC (Shown)

WTS-ANTD (Shown)

WTS-ANTE (Shown)

FORCE MEASUREMENT SOLUTIONS.

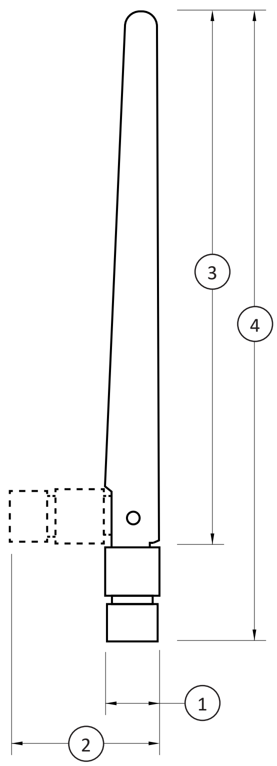
WTS-ANTA / ANTB / ANTC TELEMETRY ANTENNA OPTIONS



WTS-ANTA

DIMENSIONS

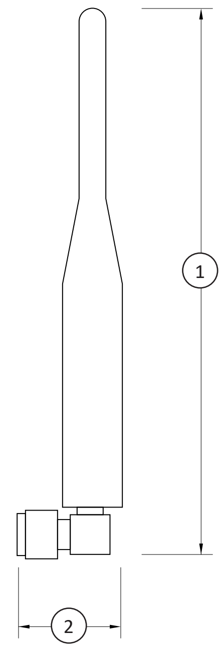
See Drawing	Metric (mm)	U.S. (in)
(1)	58	2.3
(2)	20	0.8
Height	4	0.2



WTS-ANTC

DIMENSIONS

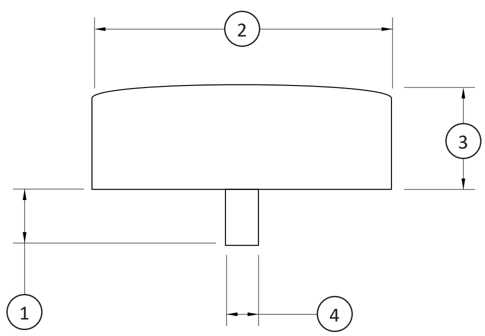
See Drawing	Metric (mm)	U.S. (in)
(1)	28	1.1
(2)	Ø10	0.4
(3)	95	3.7
(4)	113	4.4



WTS-ANTB

DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	98	3.9
(2)	19	0.7



WTS-ANTD & WTS-ANTE

DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	6	0.2
(2)	Ø53	2.1
(3)	19	0.7
(4)	Ø10	0.4
Thread	M10 X 1	

WTS-BS-1 WIRELESS HANDHELD DISPLAY FOR UNLIMITED TRANSMITTERS

The WTS-BS-1 is a roaming handheld allowing the operator to cycle the display between all available transmitter modules and forms part of the WTS modular telemetry system.

The data sent by transmitter modules can be utilized by multiple receivers such as displays, handheld readers, analog outputs, relay modules and computer interfaces. Receivers support common indU.S.trial power supplies and are available in robU.S.t IP rated enclosures with internal antennas optimized to give outstanding coverage.

The WTS-BS-1 does not require pre-configuration of associated transmitters and will wake transmitters as they come within wireless range. Two AA batteries power the handheld which has been designed for low power operation.

The WTS Toolkit software offers a fast and simple way to configure the display format.

FEATURES & BENEFITS

- Roams between transmitters in range
- Sleep / wake
- Auto shutdown
- Rugged construction

SPECIFICATIONS

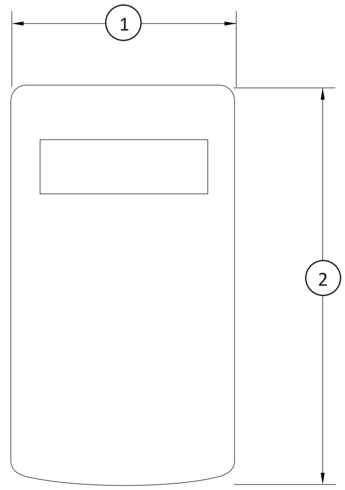
POWER SUPPLY		
Power Supply Voltage – VDC		2.5 to 3.6
2 each AA 1.5V primary cells		
BATTERY LIFE		
Based on 2 Ah capacity batteries		
ContinuoU.S. Operation – hours		35
Standby Mode (powered off) – years		1.5
RADIO		
Radio Type		License exempt transceiver
Radio Frequency – GHz		2.4
Transmit Power – mW		10
Range	m	Up to 800
	ft	Up to 2,625
ENVIRONMENTAL		
Operating Temperature Range	°C	-10 to 50
	°F	14 to 122
Storage Temperature Range (no batteries)	°C	-40 to 85
	°F	-40 to 185
Maximum Humidity – %		95 non-condensing
IP Rating Enclosure		IP67

ACCESSORIES

WTS-Case
Black leather case with clear viewing window with shoulder strap

STANDARD CONFIGURATION

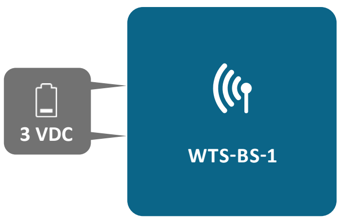
WTS-BS-1 (Shown)



DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	90	3.5
(2)	152	6.0
Height	34	1.3

ELECTRICAL



interface
FORCE MEASUREMENT SOLUTIONS.

WTS-BS-1-HA WIRELESS HANDHELD DISPLAY FOR MULTIPLE TRANSMITTERS

The WTS-BS-1-HA handheld displays data from up to 12 wireless transmitter modules and forms part of the WTS modular telemetry system.

The data sent by transmitter modules can be utilized by multiple receivers such as displays, handheld readers, analogue outputs, relay modules and computer interfaces. Receivers support common indU.S.trial power supplies and are available in robU.S.t IP rated enclosures with internal antennas optimized to give outstanding coverage.

The WTS-BS-1-HA provides either a summed total from all selected transmitters and the ability to view individual transmitters. Two AA batteries power the handheld, which has been designed for low power operation.

The WTS Toolkit software offers a fast and simple way to configure the display format, unit conversion, zero adjU.S.tment and transmitter selection. A function key can send the displayed value to other receivers such as a printer.

FEATURES & BENEFITS

- Connect up to 12 transmitters
- Tare function
- Provides summation of up to 12 transmitters
- Sleep/ wake acquisition modules
- Auto shut down
- Rugged construction

SPECIFICATIONS

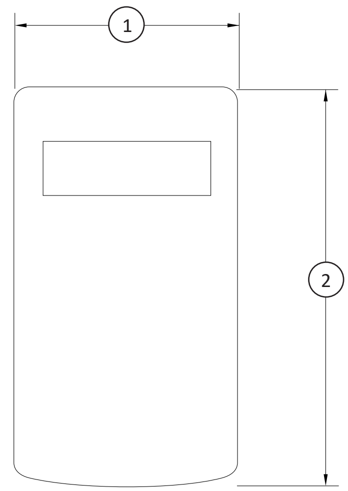
POWER SUPPLY		
Power supply voltage – VDC		2.5 to 3.6
2 each AA 1.5V primary cells		
BATTERY LIFE		
Based on 2 Ah capacity batteries		
ContinuoU.S. Operation – hours		35
Standby Mode (powered off) – years		1.5
RADIO		
Radio Type		License exempt transceiver
Radio Frequency – GHz		2.4
Transmit Power – mW		10
Range	m	Up to 800
	ft	Up to 2,625
ENVIRONMENTAL		
Operating Temperature Range	°C	-10 to 50
	°F	14 to 122
Storage Temperature Range (no batteries)	°C	-40 to 85
	°F	-40 to 185
Maximum Humidity – %		95 non-condensing
IP Rating Enclosure		IP67

ACCESSORIES

WTS-Case
Black leather case with clear viewing window with shoulder strap

STANDARD CONFIGURATION

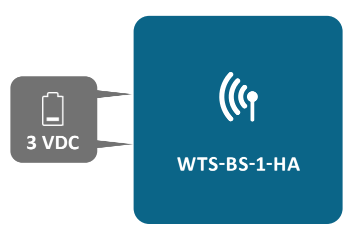
WTS-BS-1-HA (Shown)



DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	90	3.5
(2)	152	6.0
Height	34	1.3

ELECTRICAL



Interface
FORCE MEASUREMENT SOLUTIONS

WTS-BS-1-HS WIRELESS HANDHELD DISPLAY FOR SINGLE TRANSMITTERS

The WTS-BS-1-HS handheld displays data from any of the WTS wireless transmitter modules and forms part of the WTS modular telemetry system.

The data sent by transmitter modules can be utilized by multiple receivers such as displays, handheld readers, analog outputs, relay modules and computer interfaces. Receivers support common indU.S.trial power supplies and are available in robU.S.t IP rated enclosures with internal antennas optimized to give outstanding coverage.

The WTS-BS-1-HS provides a point to point connection to a single transmitter. The transmitter can be woken and sent to sleep as the handheld is turned on or off. Two AA batteries power the handheld which has been designed for low power operation.

The WTS Toolkit software offers a fast and simple way to configure the display format, unit conversion, zero adjU.S.tment and transmitter selection.

FEATURES & BENEFITS

- Simple operation
- Connection to single transmitter module
- Tare function
- Auto shutdown
- Rugged construction

SPECIFICATIONS

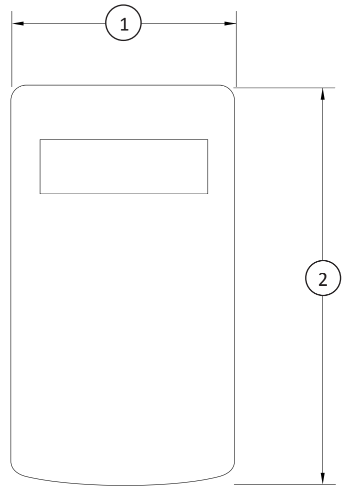
POWER SUPPLY		
Power Supply Voltage – VDC		2.5 to 3.6
2 each AA 1.5V primary cells		
BATTERY LIFE		
Based on 2 Ah capacity batteries		
ContinuoU.S. Operation – hours		35
Standby Mode (powered off) – years		1.5
RADIO		
Radio Type		License exempt transceiver
Radio Frequency - GHz		2.4
Transmit Power - mW		10
Range	m	Up to 800
	ft	Up to 2,625
ENVIRONMENTAL		
Operating Temperature Range	°C	-10 to 50
	°F	14 to 122
Storage Temperature Range (no batteries)	°C	-40 to 85
	°F	-40 to 185
Maximum Humidity – %		95 non-condensing
IP Rating Enclosure		IP67

ACCESSORIES

WTS-Case
Black leather case with clear viewing window with shoulder strap

STANDARD CONFIGURATION

WTS-BS-1-HS (Shown)



DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	90	3.5
(2)	152	6.0
Height	34	1.3

ELECTRICAL

OPTIONS

- Peak hold functionality

WTS-BS-3E WIRELESS BASE STATION WITH U.S.B

The WTS-BS-3E is one of a range of base stations that are required for configuration and calibration of the WTS modular telemetry system. Base stations can also be U.S.ed for data collection systems by making available the WTS wireless transmitter data over the U.S.B interface.

The data sent by transmitter modules can be utilized by multiple receivers such as displays, handheld readers, analog outputs, relay modules and computer interfaces. Receivers support common indU.S.trial power supplies and are available in robU.S.t IP rated enclosures with internal antennas optimized to give outstanding coverage.

The WTS-BS-3E is hoU.S.ed in an IP50 enclosure. On Windows PCs the free WTS Toolkit is U.S.ed to configure and calibrate the WTS modular telemetry system while the free WTS logging and visualization software allows monitoring and data collection.

FEATURES & BENEFITS

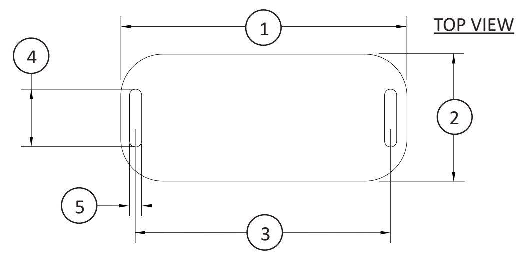
- Simple plug & play U.S.B
- Configure & calibrate the WTS range
- Data collection for PC/PLC

SPECIFICATIONS

POWER SUPPLY		
Power Supply Voltage (U.S.B) – VDC		4.875 to 5.125*
* As defined by U.S.B 2.0 specification		
RADIO		
Radio Type		License exempt transceiver
Radio Frequency – GHz		2.4
Transmit Power – mW		10
Range	m	Up to 500
	ft	Up to 1,640
ENVIRONMENTAL		
Operating Temperature Range	°C	-20 to 55
	°F	-4 to 131
Storage Temperature Range	°C	-40 to 85
	°F	-40 to 185
Maximum Humidity – %		95 non-condensing
IP Rating		IP50

STANDARD CONFIGURATION

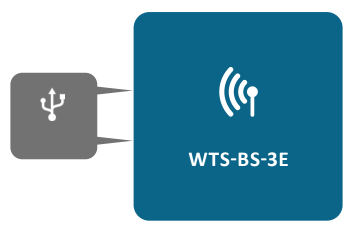
WTS-BS-3E (Shown)



DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	76	3
(2)	35	1.4
(3)	68	2.7
(4)	15	0.6
(5)	3.2	0.1
Height	20	0.8

ELECTRICAL



FORCE MEASUREMENT SOLUTIONS.

WTS-BS-4 WIRELESS BASE STATION WITH U.S.B INTERFACE IN INDU.S.TRIAL

The WTS-BS-4 is one of a range of base stations that are required for configuration and calibration of the WTS modular telemetry system. Base stations can also be U.S.ed for data collection systems by making available the WTS wireless transmitter data over the U.S.B interface.

The data sent by transmitter modules can be utilized by multiple receivers such as displays, handheld readers, analog outputs, relay modules and computer interfaces. Receivers support common indU.S.trial power supplies and are available in robU.S.t IP rated enclosures with internal antennas optimized to give outstanding coverage. The WTS-BS-4 is hoU.S.ed in an IP67 enclosure and has better coverage than the WTS-BS-3E.

On Windows PCs the free WTS Toolkit is U.S.ed to configure and calibrate the WTS modular telemetry system while the free WTS logging and visualization software allows monitoring and data collection.

FEATURES & BENEFITS

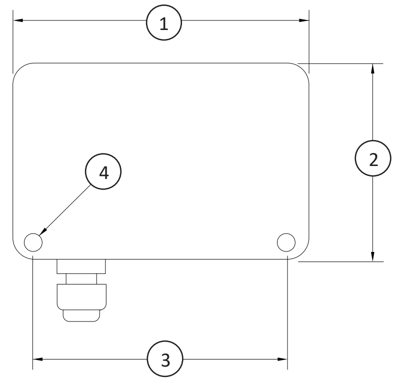
- Up to 800 m (2,625 ft) range
- Simple plug & play U.S.B
- Configure & calibrate the WTS range
- IP67/NEMA 4 rated enclosure

SPECIFICATIONS

POWER SUPPLY		
Power Supply Voltage (U.S.B) – VDC		4.875 to 5.125*
* As defined by U.S.B 2.0 specification		
RADIO		
Radio Type		License exempt transceiver
Radio Frequency – GHz		2.4
Transmit Power – mW		10
Range	m	Up to 800
	ft	Up to 2,625
ENVIRONMENTAL		
Operating Temperature Range	°C	-20 to 55
	°F	-4 to 131
Storage Temperature Range	°C	-40 to 85
	°F	-40 to 185
Maximum Humidity – %		95 non-condensing
IP Rating		IP67/Nema4

STANDARD CONFIGURATION

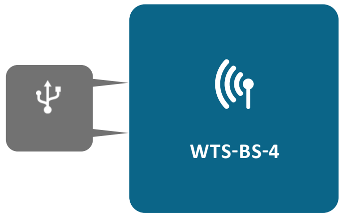
WTS-BS-4 (Shown)



DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	80	3.1
(2)	62	2.4
(3)	66.5	2.6
(4)	Ø4.8	Ø0.2
Height	34	1.3

ELECTRICAL



interface

FORCE MEASUREMENT SOLUTIONS.

WTS-BS-5/DT WIRELESS ANALOG OUTPUT RECEIVER MODULE

The WTS-BS-5 Receiver converts data from a WTS wireless transmitter module into an analogue output and forms part of the WTS modular telemetry system. Data from any of the WTS range of transmitters can be U.S.ed.

The data sent by transmitter modules can be utilized by multiple receivers such as displays, handheld readers, analog outputs, relay modules and computer interfaces. Receivers support common indU.S.trial power supplies and are available in robU.S.t IP rated enclosures with internal antennas optimized to give outstanding coverage.

The WTS-BS-5 offers, as Standard, a U.S.er choice of analog outputs; 0-10 V, 4-20 mA, 0-20 mA, ±10 V, ±5 V. A choice of a desktop enclosure or an IP67 sealed enclosure allows selection of a module to suit your individual application. The WTS Toolkit offers a fast and simple way to configure the analog output scaled from any

SPECIFICATIONS

VOLTAGE OUTPUT SPECIFICATIONS		
Voltage Ranges – V		0-5, 0-10, ±5, ±10
Resolution / Bits		65,000 / 16
Output Gain Stability – %FS / °C MAX		±0.015
Output Zero Stability – %FS / °C MAX		±0.015
Linearity – % FS MAX		±0.01
Minimum Load Impedance – Ω		5000
CURRENT OUTPUT SPECIFICATIONS		
Current Ranges – mA		4-20, 0-20 sink & source
Resolution / Bits		65,000 / 16
Output Gain Stability – %FS / °C MAX		±0.03
Output Zero Stability – %FS / °C MAX		±0.02
Linearity – %FS MAX		±0.02
Minimum Load Impedance – Ω		500
POWER SUPPLY		
Power Supply Voltage – VDC		9 to 32
Supply Current at 12V (typical) – mA		100
RADIO		
Radio Type		License exempt transceiver
Radio Frequency – GHz		2.4
Transmit Power – mW		10
WTS-BS-5DT Range	m	Up to 500
	ft	Up to 1,640
WTS-BS-5 Range	m	Up to 800
	ft	Up to 2,625
ENVIRONMENTAL		
Operating Temperature Range	°C	-20 to 55
	°F	-4 to 131
Storage Temperature Range (no batteries)	°C	-40 to 85
	°F	-40 to 185
Maximum Humidity – %		95 non-condensing
WTS-BS-5DT IP Rating		IP50
WTS-BS-5 IP Rating		IP67/Nema4

STANDARD CONFIGURATION

WTS-BS-5DT (Shown)

WTS-BS-5 (Shown)

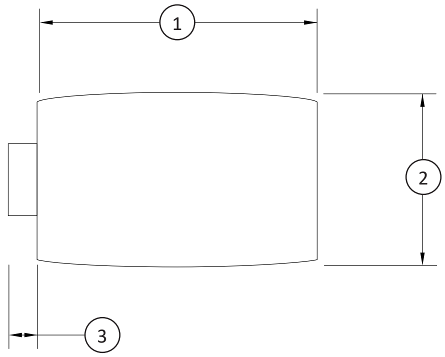
FEATURES & BENEFITS

- Provide analog output for WTS acquisition modules
- One to one transmission up to 2000 updates per second (dependent on acquisition module)
- IndU.S.trial & desktop versions available

ELECTRICAL

FORCE MEASUREMENT SOLUTIONS.

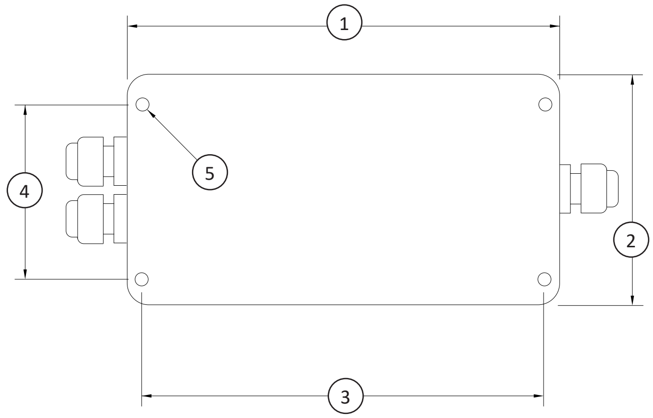
WTS-BS-5/DT WIRELESS ANALOG OUTPUT RECEIVER MODULE



WTS-BS-5DT (Shown)

DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	146	5.7
(2)	88	3.5
(3)	13	0.5
Height	25	1.0



WTS-BS-5 (Shown)

DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	164	6.5
(2)	84	3.3
(3)	148	5.8
(4)	50	2.0
(5)	Ø4.5	Ø0.2
Height	57	2.2

FORCE MEASUREMENT SOLUTIONS.

WTS-BS-6 WIRELESS TELEMETRY DONGLE BASE STATION

The WTS wireless telemetry dongle base station (WTS-BS-6) is the smallest in our base station range and offers line of sight range of up to 500 m (1,640 ft) for all wireless telemetry modules.

It draws power from the U.S.B bU.S. and therefore no further components are required to configure and control remote devices from a PC.

This plug and play U.S.B base station provides a portable solution, with no cables, making it ideal for laptops, tablets that run a full version of Windows.

FEATURES & BENEFITS

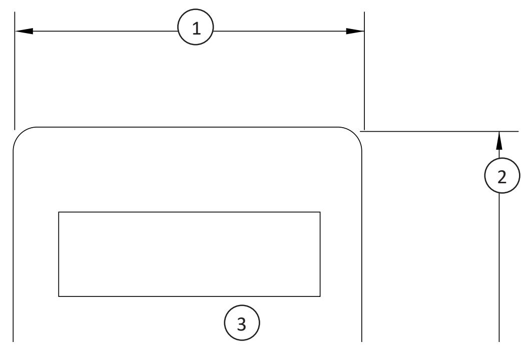
- **Compact & Portable:**
  Provides a small, portable solution with no cables making it ideal for laptops and tablets
- **Quick Setup:**
  Simple U.S.B "Plug and Measure" device connects directly to a PC
- **Fast Configuration:**
  Allowing quick configuration via the WTS Toolkit software
- **500 m Wireless Range:**
  Provides a line of sight range of up to 500 m (1640 ft)
- **Portable Logging:**
  Fast portable logging is available via the WTSLOG100 logging and visualization software

SPECIFICATIONS

POWER SUPPLY		
Power Supply Voltage (U.S.B) – VDC		4.875 to 5.125*
*As defined by U.S.B 2.0 specification		
RADIO		
Radio type		License exempt transceiver
Radio Frequency – GHz		2.4
Transmit Power – mW		10
Range	m	Up to 500
	ft	Up to 1,640
ENVIRONMENTAL		
Operating Temperature Range	°C	-20 to 55
	°F	-4 to 131
Storage Temperature Range	°C	-40 to 85
	°F	-40 to 185
Maximum Humidity – %		95 non-condensing
IP Rating		IP50

STANDARD CONFIGURATION

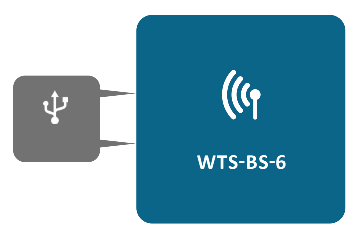
WTS-BS-6 (Shown)



DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	58	2.3
(2)	20.5	0.8
(3)	46	1.8
Height	11	0.4

ELECTRICAL



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WTS-GW1 WIRELESS GATEWAY WITH MODBU.S. AND ASCII SERIAL

The WTS-GW1 is a gateway that provides a Standard serial interface to gather data from up to 100 transmitter modules in a WTS telemetry system U.S.ing either the ModbU.S. RTU protocol or a simple ASCII protocol.

The data sent by transmitter modules can be utilized by multiple receivers such as displays, handheld readers, analog outputs, relay modules and computer interfaces. Receivers support common indU.S.trial power supplies and are available in robU.S.t IP rated enclosures with internal antennas optimized to give outstanding coverage.

The WTS-GW1 supports RS232 and RS485 connectivity. Some simple commands are available to wake, sleep, and keep awake WTS transmitter modules.

The WTS Toolkit software offers a fast and simple way to configure the gateway module.

FEATURES & BENEFITS

- Can gather data from up to 100 acquisition modules
- Standard communication interface
- Wireless configuration
- Range of up to 800 m (2,625 ft)
- Free software

INDU.S.TRY SOLUTIONS

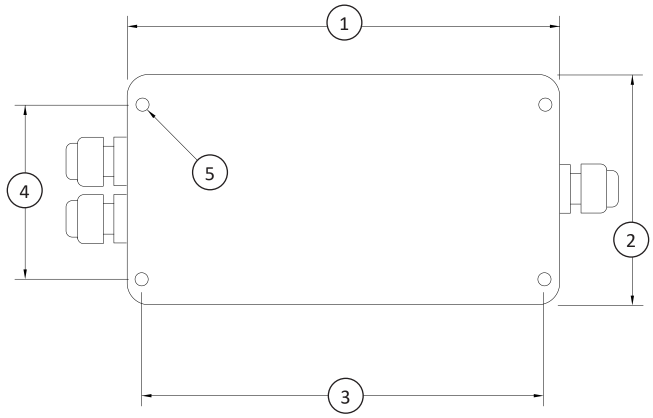
- Interface with indU.S.trial PLC's
- Simple connection to existing DAQ systems (i.e. LabVIEW or DASYLab)

SPECIFICATIONS

POWER SUPPLY		
Power Supply Voltage – VDC		9 to 32
Supply Current at 12V (typical) – mA		100
RADIO		
Radio Type		License exempt transceiver
Radio Frequency – GHz		2.4
Transmit Power – mW		10
Range	m	Up to 800
	ft	Up to 2,625
ENVIRONMENTAL		
Operating Temperature Range	°C	-20 to 55
	°F	-4 to 131
Storage Temperature Range	°C	-40 to 85
	°F	-40 to 185
Maximum Humidity – %		95 non-condensing
IP Rating (excluding U.S.B connector)		IP67/Nema4

STANDARD CONFIGURATION

WTS-GW1 (Shown)



DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	164	6.5
(2)	84	3.3
(3)	148	5.8
(4)	50	2.0
(5)	Ø4.5	Ø0.2
Height	57	2.2

ELECTRICAL

FORCE MEASUREMENT SOLUTIONS

WTS-LD1 WIRELESS LARGE LED DISPLAY

The WTS-LD1 provides the U.S.er with a large format four-digit display capable of displaying individual WTS transmitter values or the summed value of up to eight modules.

The data sent by transmitter modules can be utilized by multiple receivers such as displays, handheld readers, analog outputs, relay modules and computer interfaces. Receivers support common indU.S.trial power supplies and are available in robU.S.t IP rated enclosures with internal antennas optimized to give outstanding coverage.

U.S.ing the PC based WTS Toolkit software and a U.S.B base station the U.S.er can quickly and easily select and configure the associated transmitter modules. The WTS Toolkit also provides configuration of the display format and zero functions. Further wired Logic Inputs allow the U.S.er to remotely control Tare and Net/Gross toggle

FEATURES & BENEFITS

- Large screen with 4-digit, 100 mm (4 in) LED display
- Mounting Options: ceiling sU.S.pended or wall mounted
- Tare function

SPECIFICATIONS

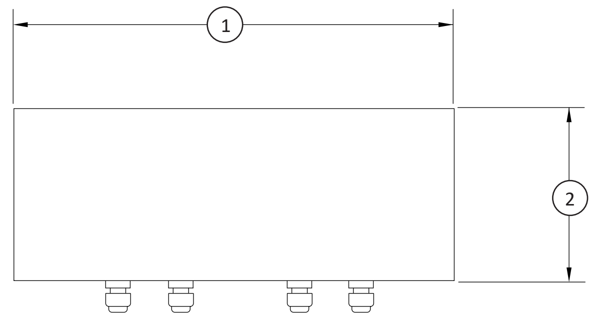
POWER SUPPLY		
Power Supply Voltage – VDC		11 to 30
Supply Current (Max) – A		3.5
RADIO		
Radio Type		License exempt transceiver
Radio Frequency – GHz		2.4
Transmit Power – mW		10
Range	m	Up to 800
	ft	Up to 2,625
ENVIRONMENTAL		
Operating Temperature Range	°C	0 to 50
	°F	32 to 122
Storage Temperature Range	°C	-20 to 70
	°F	-4 to 158
Maximum Humidity – %		95 non-condensing
IP Rating (excluding U.S.B connector)		IP65

POSSIBLE DISPLAY VALUES

Negative Display Values	Positive Display Values
-1999	9999
-199.9	999.9
-19.99	99.99
-1.999	9.999

STANDARD CONFIGURATION

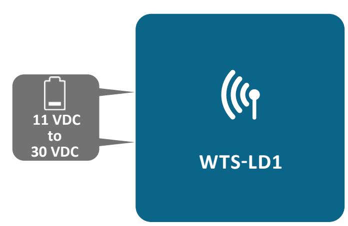
WTS-LD1 (Shown)



DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	435	17.1
(2)	195	7.7
Height	77	3.0

ELECTRICAL



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WTS-LD2 WIRELESS LARGE LED DISPLAY

The WTS-LD1 provides the U.S.er with a large format four-digit display capable of displaying individual WTS transmitter values or the summed value of up to eight modules.

The data sent by transmitter modules can be utilized by multiple receivers such as displays, handheld readers, analog outputs, relay modules and computer interfaces. Receivers support common indU.S.trial power supplies and are available in robU.S.t IP rated enclosures with internal antennas optimized to give outstanding coverage.

U.S.ing the PC based WTS Toolkit software and a U.S.B base station the U.S.er can quickly and easily select and configure the associated transmitter modules. The WTS Toolkit also provides configuration of the display format and zero functions. Further wired Logic Inputs allow the U.S.er to remotely control Tare and Net/Gross toggle

FEATURES & BENEFITS

- Large screen with 4-digit, 100 mm (4 in) LED display
- Mounting Options: ceiling sU.S.pended or wall mounted
- Tare function

SPECIFICATIONS

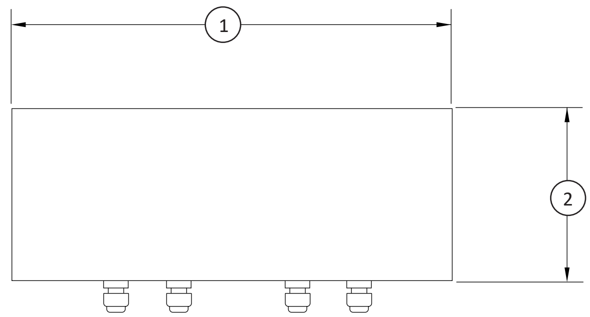
POWER SUPPLY		
Power Supply Voltage – VDC		11 to 30
Supply Current (Max) – A		3.5
RADIO		
Radio Type		License exempt transceiver
Radio Frequency – GHz		2.4
Transmit Power – mW		10
Range	m	Up to 800
	ft	Up to 2,625
ENVIRONMENTAL		
Operating Temperature Range	°C	0 to 50
	°F	32 to 122
Storage Temperature Range	°C	-20 to 70
	°F	-4 to 158
Maximum Humidity – %		95 non-condensing
IP Rating (excluding U.S.B connector)		IP65

POSSIBLE DISPLAY VALUES

Negative Display Values	Positive Display Values
-1999	9999
-199.9	999.9
-19.99	99.99
-1.999	9.999

STANDARD CONFIGURATION

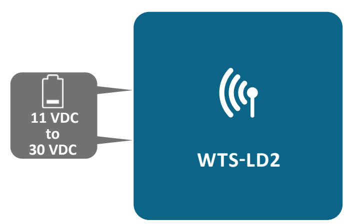
WTS-LD2 (Shown)



DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	435	17.1
(2)	195	7.7
Height	77	3.0

ELECTRICAL



WTS-PR1 WIRELESS TELEMETRY PRINTER

The WTS-PR1 is a thermal printer module that can generate a U.S.er defined ticket that can contain live values and sum of up to eight WTS transmitters and forms part of the WTS modular telemetry system.

The data sent by transmitter modules can be utilized by multiple receivers such as displays, handheld readers, analog outputs, relay modules and computer interfaces. Receivers support common indU.S.trial power supplies with internal antennas optimized to give outstanding coverage.

The printout can be triggered from the arrival of data from a specific module or alternatively by a handheld module. The WTS Toolkit software offers a fast and simple way to configure the ticket format and to choose the associated

FEATURES & BENEFITS

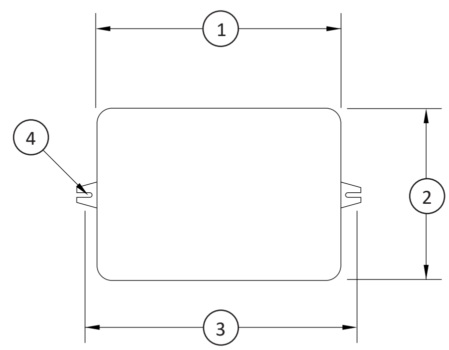
- Prints screen from the handheld WTS-BS-1-HA
- Simple design (F1 button)
- U.S.er definable reports/print outs
- Suitable for vehicle applications

SPECIFICATIONS

PRINTER		
Printing Method		Direct Thermal Line printing
Paper Width – mm		57
Paper Roll Diameter – mm		35
Print Width – mm		48
POWER SUPPLY		
Power Supply Voltage – VDC		9 to 32
Supply Current When Idle – mA		100
Supply Current When Printing (peak) – A		3
RADIO		
Radio Type		License exempt transceiver
Radio Frequency – GHz		2.4
Transmit Power – mW		10
Range	m	Up to 800
	ft	Up to 2,625
ENVIRONMENTAL		
Operating Temperature Range	°C	5 to 50
	°F	41 to 122
Storage Temperature Range	°C	-20 to 60
	°F	-4 to 140
Maximum Humidity – %		95 non-condensing
IP Rating (excluding U.S.B connector)		IP20

STANDARD CONFIGURATION

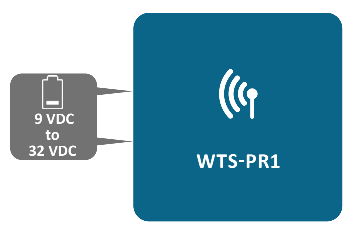
WTS-PR1 (Shown)



DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	150	5.9
(2)	100	3.9
(3)	170	6.7
(4)	Ø4.5	Ø0.2
Height	100	3.9

ELECTRICAL



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WTS-RDC WIRELESS REMOTE DATA COLLECTION

The WTS-RDC U.S.es a Quad Band GPRS modem to log and report data to multiple destinations including web services, email addresses and mobile phones, allowing for worldwide access to data.

WTS transmitter values are also compared to U.S.er defined limits which can trigger alert messages allowing real time monitoring of an entire system.

Data can be collected and delivered at predefined intervals in the form of a CSV file or cU.S.tomized data can be delivered to a wide range of cloud data collection and analysis services. SMS messages and email can also be sent as triggered alerts or at intervals.

Low power modes allow the WTS-RDC to operate from external battery packs or from solar panel systems.

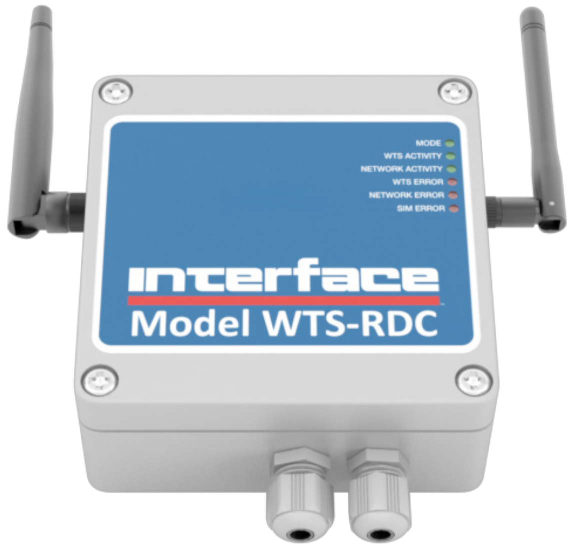
FEATURES & BENEFITS

- Ideal for remote applications
- Wireless input range of up to 800 m (2,625 ft)
- Output data to anywhere in the world
- Collect data from up to 200 sensors
- Re-configure settings remotely U.S.ing SMS
- Alert functionality
- Free software

SPECIFICATIONS

POWER SUPPLY		
Power Supply Voltage Range – VDC		9 to 32
Average Operating Current When GSM Active - mA		350
GSM/GPRS RADIO		
Radio Type		Quad-band EGSM
Radio Frequency – MHz		850/900/1800/1900
Output Power Class 4 @ 850 / 900 MHz – W		12
Output Power Class 1 @ 1800 / 1900 MHz – W		1
GSM/GPRS RADIO		
Radio Type		Quad-band EGSM
Radio Frequency – MHz		850/900/1800/1900
Transmit Power – mW		10
Output Power Class 4 @ 850 / 900 MHz – W		12
Output Power Class 1 @ 1800 / 1900 MHz – W		1
ENVIRONMENTAL		
Operating Temperature Range	°C	-20 to 55
	°F	-4 to 131
Storage Temperature Range	°C	-20 to 55
	°F	-4 to 131
Maximum Humidity – %		95 non-condensing

STANDARD CONFIGURATION



WTS-RDC (Shown)

OPTIONS

WTS-RDC-1
Wireless remote data collection – 1 transmitter

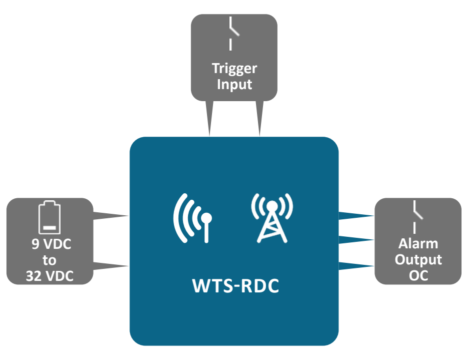
WTS-RDC-2
Wireless remote data collection – 2 transmitters

WTS 4-RDC-5
Wireless remote data collection – 5 transmitters

WTS-RDC-10
Wireless remote data collection – 10 transmitters

WTS-RDC-200
Wireless remote data collection – 200 transmitters

ELECTRICAL



WTS-RM1 WIRELESS RELAY OUTPUT RECEIVER MODULE

The WTS-RM1 Receiver acts on data from any of the WTS wireless transmitter modules and can be U.S.ed for alarm and control purposes forming part of the WTS modular telemetry system.

The data sent by transmitter modules can be utilized by multiple receivers such as displays, handheld readers, analog outputs, relay modules and computer interfaces. Receivers support common indU.S.trial power supplies and are available in robU.S.t IP rated enclosures with internal antennas optimized to give outstanding coverage.

The WTS-RM1 offers two single pole changeover relays with mains rated 5 amp contacts for power switching. Functionality includes set-points, inversion, latching and hysteresis. The WTS Toolkit offers a fast and simple way to configure the relays operation and set-point values, which are entered in the engineering units of the associated transmitter modules.

FEATURES & BENEFITS

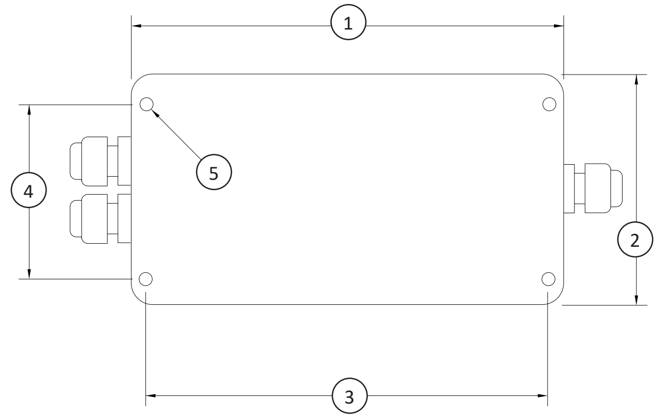
- Provides limit switching
- Two relays mains rated
- Accepts up to 16 devices
- Provides a range of relay operation modes
- Loss of signal alarm relay
- Latch and inversion Options for all relays

SPECIFICATIONS

POWER RELAY OUTPUTS		
Number of Power Relays		2
Type of Relay		SPCO
Contact Rating – A @ VAC		5 @ 24
ALARM RELAY OUTPUTS		
Number of Alarm Relays		1
Type of Relay		SPCO
Contact Rating – A @ VDC		1 @ 24
DIGITAL INPUTS		
Number of Digital Inputs		3
Type of Input		Volt free contact
POWER SUPPLY		
Power Supply Voltage – VDC		9 to 32
Supply Current at 12V (typical) – mA		150
RADIO		
Radio Type		License exempt transceiver
Radio Frequency – GHz		2.4
Transmit Power – mW		10
Range	m	Up to 800
	ft	Up to 2,625
ENVIRONMENTAL		
Operating Temperature Range	°C	-20 to 55
	°F	-4 to 131
Storage Temperature Range (no batteries)	°C	-40 to 85
	°F	-40 to 185
Maximum Humidity – %		95 non-condensing
IP Rating (excluding U.S.B connector)		IP67/Nema4

STANDARD CONFIGURATION

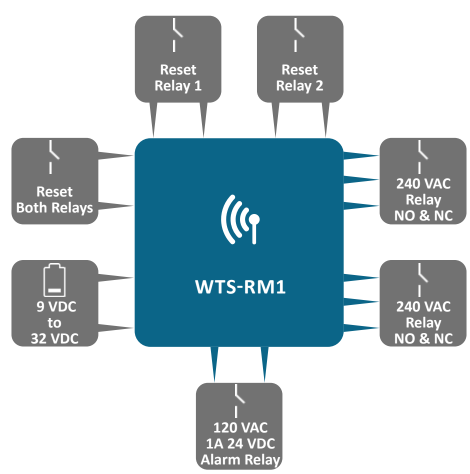
WTS-RM1 (Shown)



DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	164	6.5
(2)	84	3.3
(3)	148	5.8
(4)	50	2.0
(5)	Ø4.5	Ø0.2
Height	57	2.2

ELECTRICAL



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FORCE MEASUREMENT SOLUTIONS.

WTS-SO WIRELESS INTERFACE WITH ASCII SERIAL OUTPUT

The WTS-SO outputs a U.S.er defined ASCII report that can contain live values and sum of up to eight WTS transmitters and forms part of the WTS modular telemetry system.

The data sent by transmitter modules can be utilized by multiple receivers such as displays, handheld readers, analog outputs, relay modules and computer interfaces. Receivers support common indU.S.trial power supplies and are available in robU.S.t IP rated enclosures with internal antennas optimized to give outstanding coverage.

The WTS-SO supports RS232 and RS485 connectivity.

The WTS Toolkit software offers a fast and simple way to configure the report format and to choose the associated transmitter modules. The reports could be jU.S.t a single line giving a value to be fed into a serial display, for example, or could be a multi-line report for delivery to a printer.

FEATURES & BENEFITS

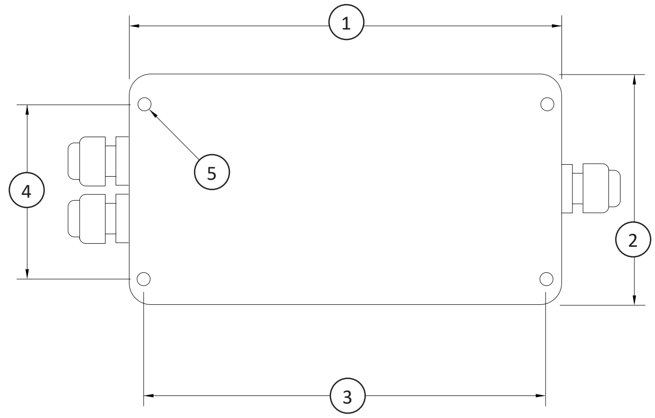
- ASCII serial output
- Serial output to printer, display, PC or PLC
- Simple configuration and calibration
- Wireless range of up to 800 m (up to 2,625 ft)

SPECIFICATIONS

POWER SUPPLY		
Power Supply Voltage – VDC		9 to 32
Supply Current at 12V (typical) – mA		100
RADIO		
Radio Type		License exempt transceiver
Radio Frequency – GHz		2.4
Transmit Power – mW		10
Range	m	Up to 800
	ft	Up to 2,625
ENVIRONMENTAL		
Operating Temperature Range	°C	-20 to 55
	°F	-4 to 131
Storage Temperature Range (no batteries)	°C	-40 to 85
	°F	-40 to 185
Maximum Humidity – %		95 non-condensing
IP Rating (excluding U.S.B connector)		IP67/Nema4

STANDARD CONFIGURATION

WTS-SO (Shown)



DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	164	6.46
(2)	84	3.31
(3)	148	5.83
(4)	50	1.97
(5)	Ø4.5	Ø0.18
Height	57	2.24

ELECTRICAL

INTERFACE
FORCE MEASUREMENT SOLUTIONS.

WTS-WSS WIRELESS WIND SPEED TRANSMITTER MODULE

The wireless wind speed transmitter module (WTS-WSS) provides high accuracy measurement and offers a quick and effective solution for monitoring wind speeds in a wide variety of applications and indU.S.tries.

The WTS-WSS U.S.es a low power mode between transmissions to maximize battery life in the field whilst offering class leading wireless coverage range of up to 800 m (2,625 ft).

The Anemometer Features a high quality 3-cup rotor in a rugged enclosure, providing rolling average wind speeds between 5 mph to 125 mph. It will also measure gU.S.ts at U.S.er defined periods of 1, 3, 5, or 10 sec. Wind speed measurement is available in m/s, fps, mph, km/h, or kn.

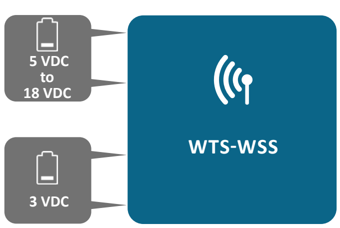
The device is powered either from internal batteries or an external supply. For applications which require high sampling rates for long periods, Interface's power pack (WTS-PP1) and solar panel (WTS-SP1) offer an ideal solution.

Forming part of the WTS modular telemetry system, the data transmitted by the WTS-WSS can be received by multiple WTS receivers that include displays, handheld readers, analogue outputs, relay modules and computer interfaces.

FEATURES & BENEFITS

- Low power mode providing exceptional battery life in excess of 12 months
- Constantly monitors average wind speed
- Measures gU.S.ts at U.S.er defined periods
- Quick and simple installation
- Wireless range up to 800 m (2,625 ft)
- Supplied pre-calibrated
- Simple configuration via WTS Toolkit software
- Improved flexible design
- Variable sampling
- Variety of different output units available
- Can be linked to a variety of the WTS peripherals
- Free visualization software also available

ELECTRICAL



STANDARD CONFIGURATION

WTS-WSS (Shown)

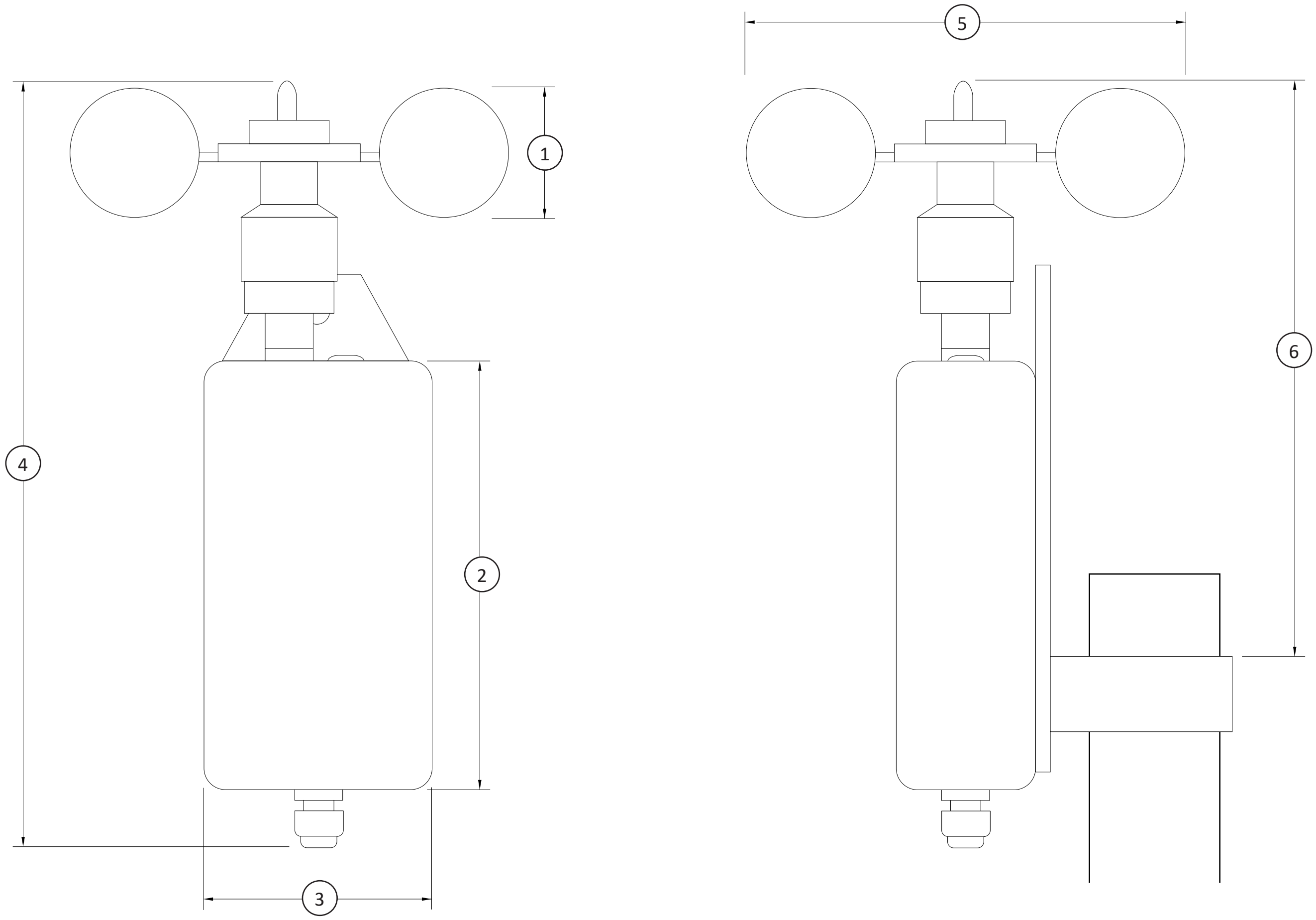
SPECIFICATIONS

PARAMETER		
Measurement Range – mph		5 – 125
Accuracy 5 to 10 mph – mph		±0.5
Accuracy 10 to 125 mph – %		±4
ENVIRONMENTAL		
Operating Temperature Range	°C	-20 to 55
	°F	-4 to 131
Storage Temperature Range (no batteries)	°C	-40 to 85
	°F	-40 to 185
Maximum Humidity – %RH		95
Environmental Protection with Suitable Cables Existing Through Cable Glands		IP67
POWER SUPPLY		
Standby/Low Power Mode – µA		5 – 20
Normal Mode on Constantly – mA		55 – 60
Reverse Polarity Protection – VDC		-32
INTERNAL		
Battery Supply Voltage (2 each D Cells) – VDC		2.1 – 3.6
EXTERNAL		
Power Supply Voltage – VDC		5 – 18
Power Supply Ripple – mV ac pk-pk		50
BATTERY LIFE IN LOW POWER MODE GENERATING RESULTS EVERY SECOND		
Pair of D Cells Constantly On – year		1
Pair of D Cells 12 Sessions Per Day of 10 mins – years		6

ACCESSORIES

WTS-WSS-P
Wireless wind speed transmitter module with pivot bar for mounting to moving booms

WTS-WSS WIRELESS WIND SPEED TRANSMITTER MODULE



DIMENSIONS

See Drawing	Metric (mm)	U.S. (in)
(1)	50	2.0
(2)	163	6.4
(3)	84	3.3
(4)	295	11.6
(5)	165	6.5
(6)	230	9.1

interface
FORCE MEASUREMENT SOLUTIONS.

IAHD-1 ADVANCED WIRELESS HANDHELD DISPLAY

The IAHD-1 handheld is a rugged and versatile digital handheld display with a broad range of Features. At the heart of the ergonomically designed handheld is a powerful PCB providing indU.S.try leading Features, such as U.S.er selectable units of measure (MT, lbs, kg and kN), programmable audible overload alarm, peak hold, pre-set tare and a U.S.er resettable overload counter. This crucial overload alarm is a requirement for many safety and quality control departments, as it keeps track of overload events, allowing the load cell in question to be removed from service immediately following the calibration voiding overload event. The load cell in question can then be sent out for proper testing and, if necessary, recalibration before re-entering service.

FEATURES AND BENEFITS

- Overload functionality
- U.S.er selectable 90db audible overload alarm
- Multiple display units – MT, lbs, kg and kN
- 100Hz peak hold
- Pre-set tare
- Wireless range of 610 m (2,000 ft)
- 60 hours battery life

STANDARD CONFIGURATION

MODEL IAHD-1 (Shown)

SPECIFICATIONS

Transmission Distance	m	Up to 610 (clear line of sight)
	ft	Up to 2,000 (clear line of sight)
Battery		AA Alkaline x 2
Battery Life – hrs		60 continuoU.S. U.S.e
Display Type	mm	6-digit, 25
	in	6-digit, 1
Display Rate – Hz		3
Max Resolution		1 part in 999,999 (normal mode)
Operating Temperature	°C	-10 to +50
	°F	+14 to +122
Connectivity – GHz		Wireless 2.4
Environmental Protection Level		IP65 / NEMA 4X

Notes:

Notes:

Calibration Systems

Load Frames

Desktop

Portable

Transfer Standard

Signal Conditioning Board

FORCE MEASUREMENT SOLUTIONS.

GS-SYS GOLD STANDARD® CALIBRATION SYSTEM (U.S. & METRIC)

Features AND BENEFITS

- Capacities from 25K, 55K, & 100K lbf (110, 250, & 450 kN)
- SCB1 signal conditioning board with very low nonlinearity specification (<0.003% FS)
- Less than 0.04% RDG uncertainty
- Fully automated system will reduce calibration time by 50% to 90%
- Automated tensions and compression calibration runs can be completed in less than 5 minutes
- 4-post design provides superior stability throughout the calibration
- Innovative fixturing allows for tension and compression calibration without changing setup
- 12 inches of clearance between posts allows for easy load cell installation and removal
- Accurate and reliable load control achieved by proprietary load feedback design
- Testing and reporting per ASTM E74, ISO 376, and EN100002-3 Standards
- Automatically produces Standard reports, graphs, and performance parameter calculations
- Ability to cU.S.tomize reports and graphs
- Automatically archives data

The Interface Gold Standard® Calibration System U.S.ing the Interface Gold or Platinum Standard® Load Cells ensures a metrology system of the highest accuracy and lowest uncertainty available.

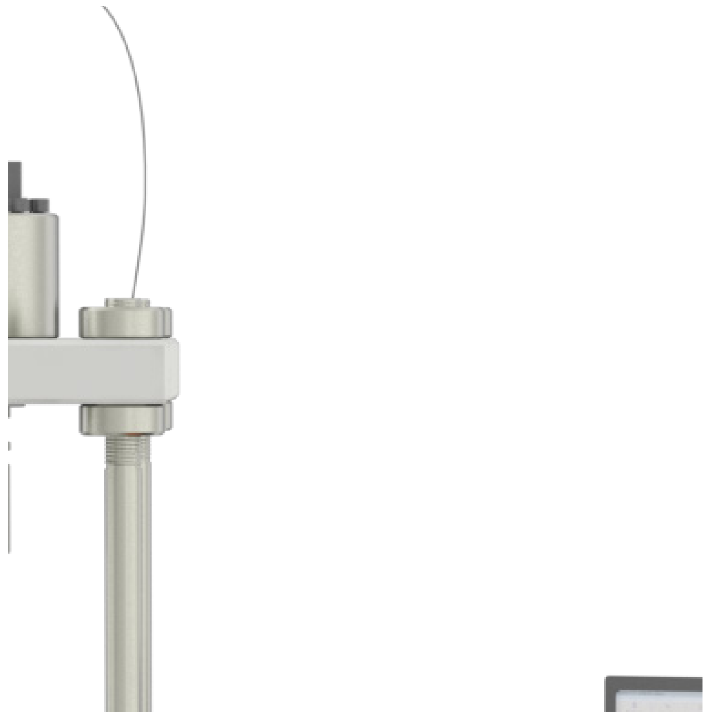
The Gold Standard® Calibration System includes:

- 25K, 55K, or 100K lbf (110, 250, or 450 kN) load frame
- Integrated control and measurement system
- Integrated computer system with Interface Gold Standard® Calibration Software
- One set of thread adapters for initial set-up and U.S.e

Additional Options include:

- Interface Gold or Platinum Standard® reference load cells
- Additional input channels for multiple bridge load cells or transducers with high level outputs
- HRBSC high performance resolution signal conditioning board with N/C <0.001% FS
- Special threads and calibration adapters
- CX Series Precision mV/V transfer Standard for system calibration
- On-site training
- GS E74 software for high level inputs
- GS E74 software for system calibrations (Transducer and display as a system)
- Hinged Safety Shield (Load cells accessible from front and left side)

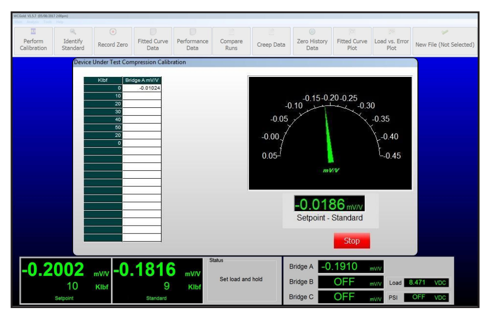
STANDARD CONFIGURATION



Model GS-SYS (Shown)

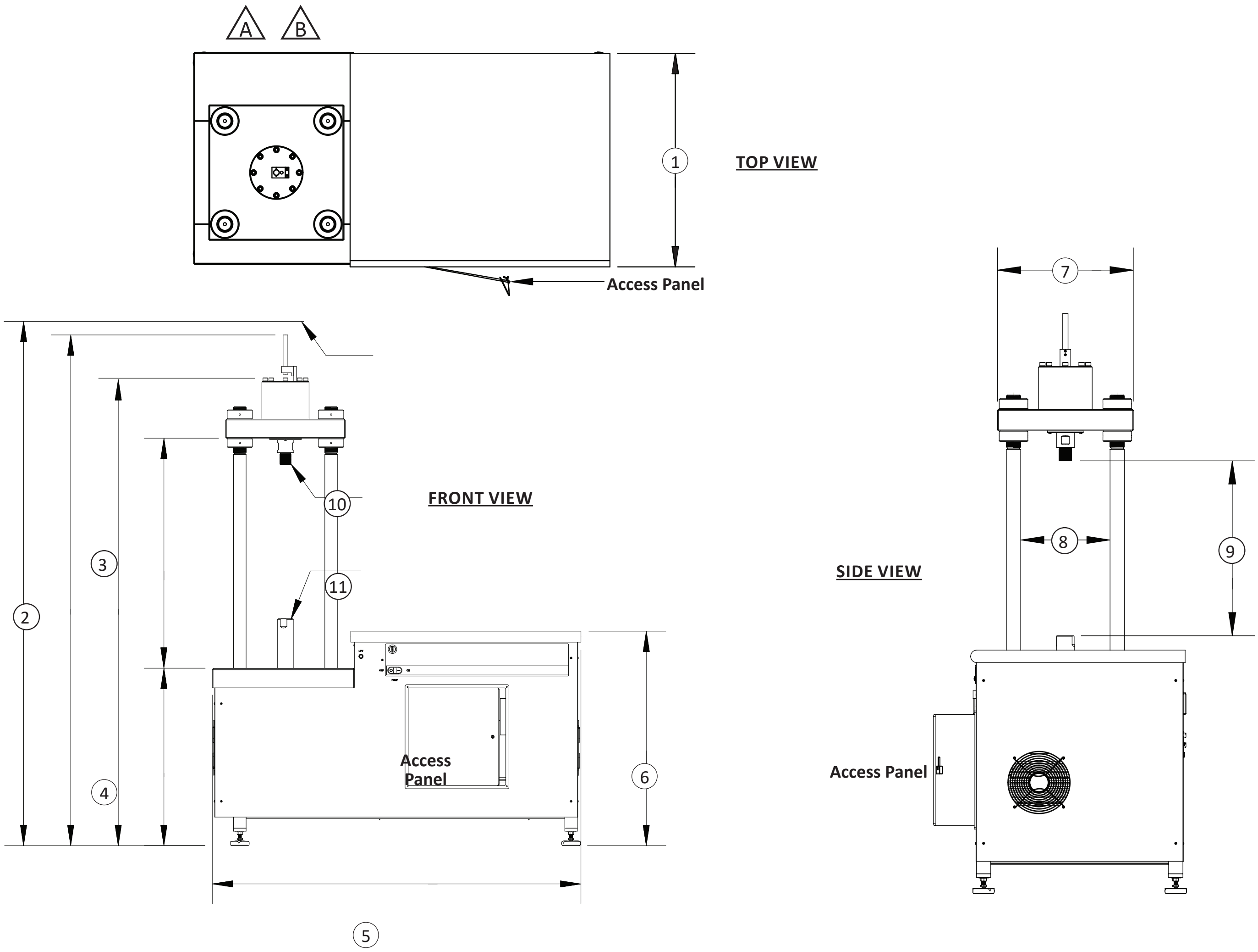
SOFTWARE

- Load points can be preset as required per your test Specifications
- The ICS-202 Gold Standard® Calibration Software ICS-202 Gold Standard® Calibration Software will provide exact load output at specific load points
- Calibration results from other runs can be compared, measured, and displayed with current run results



FORCE MEASUREMENT SOLUTIONS

GS-SYS GOLD STANDARD® CALIBRATION SYSTEM (U.S. & METRIC)



Dimensions

See Drawing	CAPICITY	
	lbf	kN
	25K, 55K, 100K	110, 250, 450
	in	mm
(1)	30.0	762
(2)	81.0	2057
(3)	36.5	927
(4)	28.2	716
(5)	58.6	1488
(6)	34.0	864
(7)	19.0	483
(8)	12.5	318
(9)	24.4 MIN / 30.4 MAX	620 MIN / 772 MAX
(10)	1.75-12 UN 2A x 1.80	1.75-12 UN 2A x 45.7
(11)	1.75-12 UN 2B x 2.0	1.75-12 UN 2B x 51

FORCE MEASUREMENT SOLUTIONS

GS-SYS GOLD STANDARD® CALIBRATION SYSTEM (U.S. & METRIC)

Specifications

LOAD FRAME		
Capacity	lbf	25K, 55K, 100K
	kN	110, 250, 450
Weight	lbs	2200
	kg	997.9
Type		Four Column, Dual Action Hydraulic
Load Cell Test Type		Compression or Tension
Horizontal Clearance	in	12.5
	mm	317.5
Vertical Clearance	in	24.4 to 30.4
	mm	619.8 to 772.2
Piston Stroke	in	6.0
	mm	152.4
Top Swivel Thread		1.75-12 Male
Bottom Actuator Thread		1.75-12 Female
Position Sensor		LVDT
Zero Control		Automatic Return
Slack Adaptor Range	in	± 0.25
	mm	± 6.35
Thread Adaptors		Base Set Included
HYDRAULIC SYSTEM		
Oil Capacity	U.S. gal	10
	L	37.85
Oil Type		Mobile DTE25 or Equivalent
Oil Over-Temperature		Automatic Cut-Off
Low Oil Level		Automatic Cut-Off Indicator

CONTROLS	
Speed Control	Automatic
Speed Selection	Configurable
Controller	PID
U.S.ER INTERFACE	
Control Interface	IndU.S.trial Computer
Software	Interface Gold Standard®
Reports	U.S.er Configurable
Test Reports Available	ASTM E74, ISO 376 or CU.S.tom
Shunt Calibration	Automatic or Manual
Curve Fit	Least Square Method
Calibration History	Compare Data with Past Results
CALIBRATION	
Uncertainty - %RDG	Less than 0.04 Uncertainty
Ranges	Dependent on Gold Standard® Load Cell
Overload Protection	U.S.er Configurable
Automatic Load Points	U.S.er Configurable
Load Measurement Range - %	1 to 100 of Load Frame Capacity
A/D Calibration Standard	Included
REQUIREMENTS	
Power Requirements - VAC Hz A CCT	208/240, Single Phase, 50/60, 20

SHIPPING INFORMATION

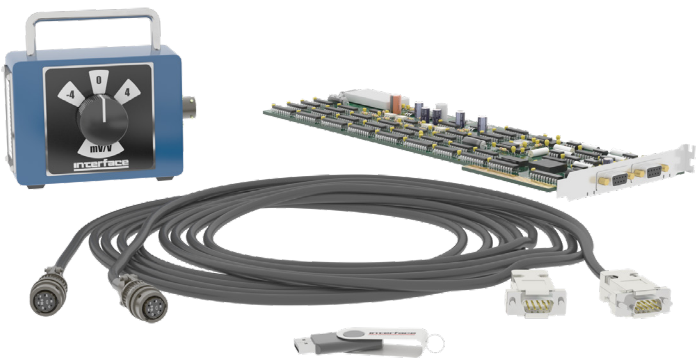
Crate Dimensions and Weight		
Dimensions - W x H x D	in	72 x 90 x 48
	mm	1828.8 x 2286 x 1219.2
Weight	lbs	2500
	kg	1133.981
Includes tilt/shock sensors		
Fork lift access		

FORCE MEASUREMENT SOLUTIONS.

GS-SYS01 GOLD STANDARD® DESKTOP LOAD CELL CALIBRATION SYSTEM

Fully Integrated PC-Based Solution for Calibration of Load Cells or Torque Transducers

STANDARD CONFIGURATION



Model GS-SYS01 (Shown)

- Windows software provides flexibility and produces consistent calibration results
- Performs ASTM E74, ISO376 and EN100002-3 calibrations
- Nonlinearity less than 0.003% FS
- Automatically archives data
- Generates Standard reports, graphs, and performance parameter calculations
- Permits easy generation of cU.S.tomized reports and graphics

GOLD Standard® LOAD CELL CALIBRATION SYSTEMS

Every new transducer or testing system mU.S.t be calibrated to determine its properties and accuracy. It is also necessary to recalibrate transducers periodically becaU.S.e of drift, possible undetected damage, and normal wear and tear. The Gold Standard® System is a complete PC-based system for the calibration of load cells and torque transducers. Normally the system is U.S.ed with a hydraulic load frame which can either be supplied by the U.S.er or by Interface. A separate software is available for the calibration of load cells in a deadweight system. Utilizing the experience obtained in almost five decades of force calibration for tens of thoU.S.ands of load cells, the system provides state-of-the-art accuracy. The system is U.S.er-friendly and calibrations can be conducted with minimal training. Pull-down menU.S. and step-by-step instructions are available to guide the operator through a complete calibration.

SYSTEM INCLUDES

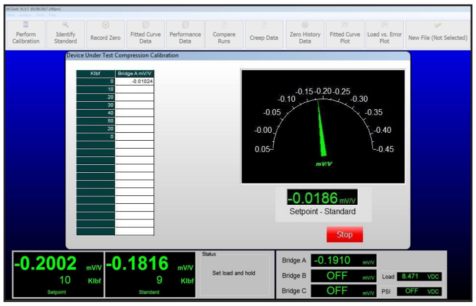
- SCB1 dual channel 20-bit signal conditioning board with 0.003% nonlinearity
- ICS-202 Gold Standard® Calibration Software
- Two Gold Standard® interconnect cable assemblies
- CX-0440 ±4mV/V transfer Standard
- SIS-104 system setup
- SIS-103 one-day training at Interface Inc.

OPTIONS

- IndU.S.trial PC
- Additional channels for calibrating multiple bridge load cells
- CX-0610 or other multi-step mV/V transfer Standards
- DA-101 digital to analog board for frame control
- HL4IO high level 4-channel input board for transducers with high level outputs
- Gold or Platinum Standard® Calibration Grade Load Cells

SOFTWARE

- Load points can be preset as required per your test Specifications
- The Gold Standard® Calibration Software will provide exact load output at specific load points
- Results from earlier runs can be compared, measured, and displayed with current run results



GS-SYS03 GOLD STANDARD® PORTABLE LOAD CELL CALIBRATION SYSTEM

Fully Integrated PC-Based Solution for Calibration of Load Cells or Torque Transducers

STANDARD CONFIGURATION

Model GS-SYS03 (Shown)

- Windows software provides flexibility and produces consistent calibration results
- Performs ASTM E74, ISO376, and EN100002-3 calibrations
- Nonlinearity less than 0.005% FS
- Automatically archives test data
- Generates Standard reports, graphs, and performance parameter calculations
- Permits easy generation of cU.S.tomized reports and graphics

GOLD Standard® LOAD CELL CALIBRATION SYSTEMS

Every new transducer or testing system mU.S.t be calibrated to determine its properties and accuracy. It is also necessary to recalibrate transducers periodically becaU.S.e of drift, possible undetected damage, and normal wear and tear. The Gold Standard® System is a complete PC-based system for the calibration of load cells and torque transducers. Normally the system is U.S.ed with a hydraulic load frame which can either be supplied by the U.S.er or by Interface. A separate software is available for the calibration of load cells in a deadweight system. Utilizing the experience obtained in almost five decades of force calibration of tens of thoU.S.ands of load cells, the system provides state-of-the-art accuracy. The system is U.S.er-friendly and calibrations can be conducted with minimal training. Pull-down menU.S. and step-by-step instructions are available to guide the operator through a complete calibration.

SYSTEM INCLUDES

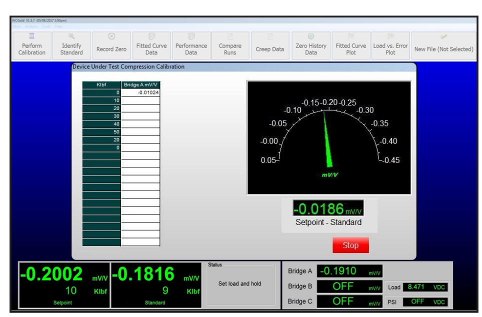
- 9840 Dual Channel 16-bit Intelligent Indicator with 0.005% non-linearity
- Internal mV/V calibration of Model 9840
- ICS-202 Gold Standard® Calibration Software
- Two Gold Standard® interconnect cable assemblies
- CX-0440 ±4 mV/V transfer Standard
- SIS-103 one-day training at Interface Inc.

OPTIONS

- Laptop PC
- CX-0610 or other multi-step mV/V transfer Standards
- Gold or Platinum Standard® Calibration Grade Load Cells
- 9840 and software for high level outputs (UDC)
- System calibration software for transducers with indicators

SOFTWARE

- Load points can be preset as required per your test Specifications
- The Gold Standard® Calibration Software measures exact load output at specific load points
- Results from earlier runs can be compared, measured, and displayed with current run results



interface
FORCE MEASUREMENT SOLUTIONS.

GS-SYS04 GOLD STANDARD® PORTABLE E4 MACHINE CALIBRATION SYSTEM

Fully Integrated PC-Based Solution for Machine Calibration

STANDARD CONFIGURATION

Model GS-SYS04 (Shown)

- Windows software provides flexibility and produces consistent calibration results
- Performs ASTM E4 Machine calibrations
- Nonlinearity less than 0.005% FS
- Automatically archives data
- Generates Standard reports, graphs, and performance parameter calculations
- Permits easy generation of cU.S.tomized reports and graphs

The Interface Portable E4 Machine Calibration System

The Interface GS-SYS04 Gold Standard® ASTM E4 Machine Calibration integrates our Model 9840 Intelligent Indicator with any Windows-based laptop computer. This solution creates a portable system for in-field calibration of force test machines. This verification involves insertion of a reference load cell (such as the Interface Gold Standard® Load Cell) into the equipment under test. Each data point in the test frame controller is compared against the reading from the reference load cell.

SYSTEM INCLUDES

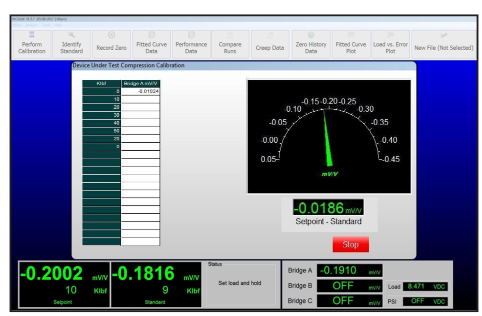
- 9840 Single Channel 16-bit Intelligent Indicator with 0.005% nonlinearity
- Internal mV/V calibration of Model 9840
- ICS-205 Gold Standard® E4 Machine Calibration Software
- Gold Standard® interconnect cable assembly
- CX-0440 ±4mV/V transfer Standard
- SIS-103 one-day training at Interface

OPTIONS

- Laptop PC
- CX-0610 or other multi-step mV/V transfer Standards
- Gold or Platinum Standard® Calibration Grade reference Standard load cells

SOFTWARE

- Results from other runs can be compared, measured, and displayed with current run results



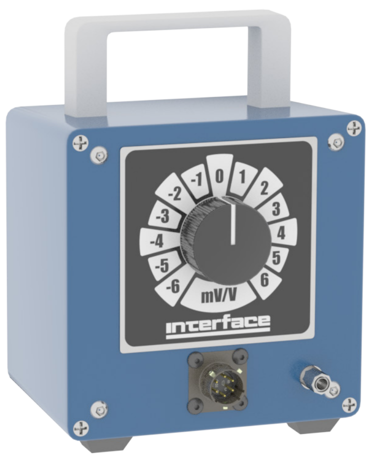
CX SERIES PRECISION mV/V TRANSFER STANDARD

FEATURES & BENEFITS

- Most accurate load cell simulator
- Special low thermal EMF construction
- Each unit individually calibrated, aged and calibrated
- Strong, rugged design
- Instrument substitution testing

Models CX-0202, CX-0610, CX-0440, CS-0330, and CX-0220 are U.S.ed for setting up and checking the Gold Standard® System Hardware. CX-0440, CX-0330, and CX-0220 are single-step mV/V transfer Standards providing precision outputs of ±4, ±3, and ±2 mV/V respectively. CX-0610 is a multi-step unit that allows the U.S.er to go from -6 mV/V to +6 mV/V in 1 mV/V steps. Model CX-0404 is specifically designed for instrument substitution testing as per ASTM E74.

STANDARD CONFIGURATION



Model CX-0610 (Shown)

Model CX-0440 (Shown)

SPECIFICATIONS

Specification	CX-0404 Multi-Step Model	CX-0610 Multi-Step Model	CX-0440 Single-Step Model	CX-0330 Single-Step Model	CX-0220 Single-Step Model
Output at Zero Setting – µV	< 0.5	< 0.5	< 1.0	< 1.0	< 1.0
Output Settings – mV/V	0, ±0.04, ±0.08, ±0.2, ±0.4, ±0.8, ±1.2,±1.6, ±2.0, ±2.4, ±3.2, ±4.0, ±4.4	-6, -5, -4, -3, -2, -1, 0, +1, +2, +3, +4, +5, +6	-4, 0, +4	-3, 0, +3	-2, 0, +2
Output Accuracy at any Non-Zero Setting, Normalized to Actual Zero Setting Output:					
Relative to Nominal Value – %	0.01 to 0.05 of setting	0.01 of setting	0.01 of setting	0.01 of setting	0.01 of setting
Relative to Value Provided in Unit-Specific Calibration Chart – %	0.0015 of setting for one year	0.0015 of setting for one year	0.0025 of setting for one year	0.0025 of setting for one year	0.0025 of setting for one year
Temperature Coefficient of Normalized Output – ppm/°C	< 5 of setting	< 5 of setting	< 5 of setting	< 5 of setting	< 5 of setting
Input and Output Resistance:					
At Zero Setting – ohms %	350 ±0.005	350 ±0.005	350 ±0.005	350 ±0.005	350 ±0.005
At Output Setting (Value Decreases With Increasing Setting, Either Polarity) – ohms	347.5	347.5	348.5	348.5	348.5

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SCB1 SIGNAL CONDITIONING BOARD 1 OR 2 CHANNEL

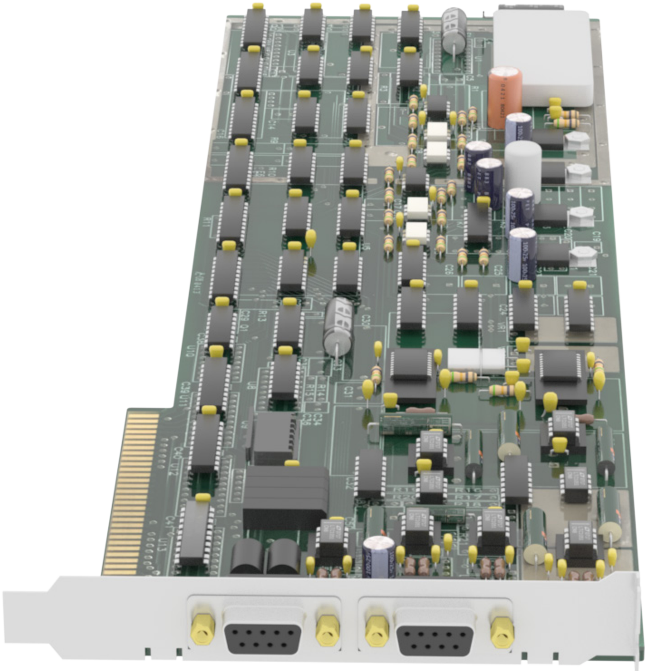
FEATURES & BENEFITS

- Nonlinearity <0.003% full scale
- 20-bit resolution
- High thermal stability
- Shunt calibration, software selectable
- Single or dual channel versions
- Bipolar
- Isolated output

SPECIFICATIONS

EXCITATION		
Excitation Voltage – VDC		10
Current – mA MAX		120
PERFORMANCE		
Resolution – bits		20
Signal Input Range – mV/V		±2.5, ±5.0, ±7.5
Conversion Rate		8 readings/second
Nonlinearity – %		<0.003 full scale
Span Temperature Coefficient – ppm/°C		<10
Zero Temperature Coefficient – µV/°C		<0.2
Span Stability (after warm up) – %		±0.003 per 24 hrs, ±0.01 per year
Zero Stability (after warm up) – µV		±10 /per year
Settling Time – sec to %		<0.25 to within 0.01
Frequency Response – Hz (dB points)		5 (-3)
Input Resistance – megohm		>100
Common Mode Rejection – dB		>90
Common Mode Voltage re: signal – V		±8 without damage
Common Mode Voltage re: ground – V		±500 peak without damage (isolated version only)
Isolation Resistance – megohms		>100 to ground
Noise – µV		<0.3 typical, 0.6 max (digital filter ON) <0.7 typical, 1.5 max (digital filter OFF)
ENVIRONMENTAL		
Operating Temperature	°F	+35 to +105
	°C	+1.67 to +40.56
Relative Humidity – MAX		80%
POWER		
DC – VDC		PC BU.S. +5 supply
Power Consumption – W MAX		10
MECHANICAL		
Dimensions	in	3.75 x 14 x 0.75 Full Size Card
	mm	95 x 356 x 19 Full Size Card

STANDARD CONFIGURATION



Model SCB1 (Shown)

The SCB1 signal conditioning board comes in a one or two-channel configuration. The single-channel unit is U.S.ed with a dead weight system and/or for test machine verification, while the two-channel unit is U.S.ed for calibrations where a reference (Standard) load cell is being U.S.ed. One channel is connected to the reference Standard and one channel is connected to the unit under

CONNECTOR

- DE-9 Socket (1 per channel)

ACCESSORIES

- Gold Standard interconnect cable assemblies
- DA-101 Digital-Analog board, U.S.ed with automated systems (consult factory)
- IndU.S.trial Computer to hoU.S.e Signal Conditioning Boards

Consult factory for more technical information

Notes:

Accessories

Cable Assemblies

Calibration Adapters

Clevises

Jam Nuts

Load Buttons

Mating Connectors

Mounting Plates

RCAL Resistors

Rod End Bearings

Thread Adapters

TEDS

CALIBRATION ADAPTORS (U.S. & METRIC)

FEATURES & BENEFITS

- Improves accuracy
- Spherical end for compression loading
- Metric sizes available

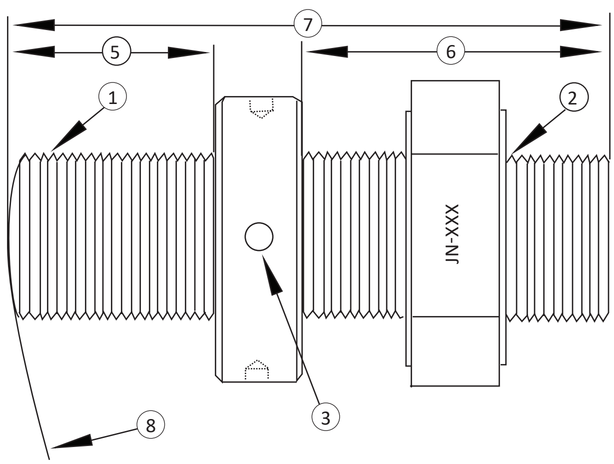
Contact U.S. today to discU.S.s the right Calibration Adaptor for your application.

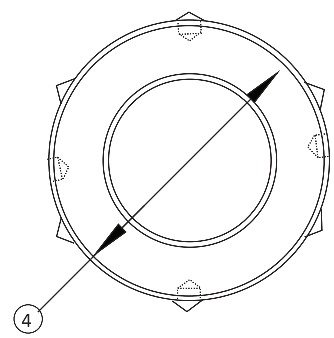
Specifications

MECHANICAL	
Material	Heat treated steel

STANDARD CONFIGURATION

Models CA-102 w/JN-105 & CA-104 w/JN-107 (Shown)





DIMENSIONS

Model	Jam nut included	Size 1 to 2	Application	3		4		5		6		7		8	
				in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
CA-101	JN-103	⅝-18 to ⅝-18	1X10 to 10K	0.25	6.35	1.25	31.8	0.75	19.1	1.5625	39.688	2.8125	71.438	SR 6	SR 152
CA-102	JN-105	1 ¼-12 to 1 ¼-12	1X20 to 50K	0.25	6.35	2	51	1.5	38	2.1875	55.563	4.1875	106.363	SR 6	SR 152
CA-103	JN-106	1 ¾-12 to 1 ¾-12	1X32 to 100K	0.25	6.35	3	76	2	51	3.125	79.38	6	152	SR 12	SR 305
CA-105	JN-106	1 ¾-12 to 2 ¾-8	1X32 to 100K	0.25	6.35	3.5	89	2	51	4.875	123.83	7.375	187.33	SR 12	SR 305
CA-104	JN-107	2 ¾-8 to 2 ¾-8	1X40 to 200K	0.3125	7.938	3.5	89	2.5	64	4.875	123.83	8.125	206.38	SR 12	SR 305
CA-201	JN-203	M16X2 to M16X2	1X10 to 50kN	0.25	6.35	1.25	31.8	0.75	19.1	1.5625	39.688	2.8125	71.438	SR 6	SR 152
CA-202	JN-205	M33X2 to M33X2	1X20 to 250kN	0.25	6.35	2	51	1.5	38	2.1875	55.563	4.1875	106.363	SR 6	SR 152
CA-203	JN-206	M42X2 to M42X2	1X32 to 450kN	0.3125	7.938	2.9375	74.613	1.8125	46.038	3.1875	80.963	5.75	146.1	SR 12	SR 305
CA-204	JN-207	M72X2 to M72X2	1X40 to 900kN	0.3125	7.938	4.25	108.0	2.75	70.0	4.75	120.7	8.25	209.6	SR 12	SR 305

Note: X refers to Low Profile™ Load Cell model numbers. For example, 1X10 could be 1010, 1110, or 1210.

CLEVISES (U.S. & METRIC)

FEATURES & BENEFITS

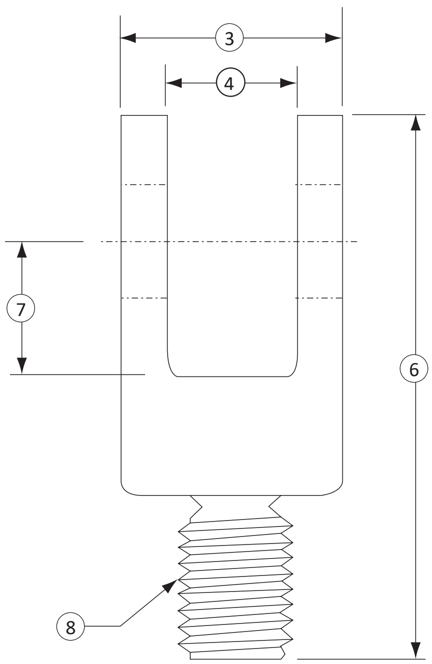
- Precision machined
- Commonly U.S.ed with REBs
- Male threads

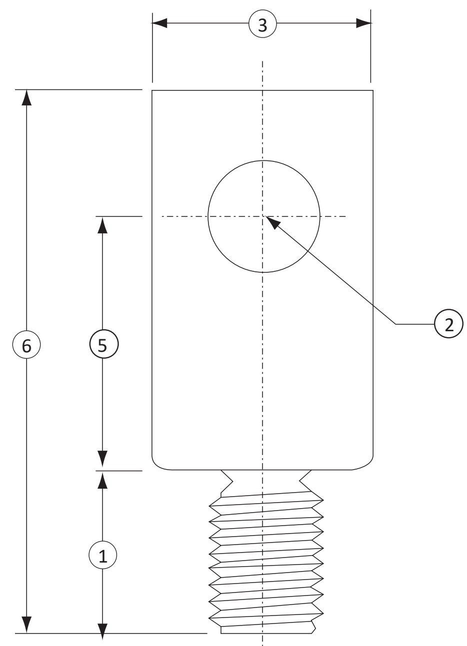
Specifications

MECHANICAL		
Model	CLV-104 CLV-105	CLV-101 CLV-102 CLV-106
Material	Aluminum	Heat treated steel

STANDARD CONFIGURATION

Models CLV-104 & CLV-102 (Shown)





DIMENSIONS

See Drawing	CLV-104		CLV-105		CLV-106		CLV-101		CLV-102	
	SM-10 THRU 250 SSM-50 THRU 250		SM-500, 1000 SSM-500 THRU 1000		SSM-2000, 3000		1110 & 1210-300 THRU 10K, SSM-5K		1120 & 1220-25K, 50K	
	in	mm	in	mm	in	mm	in	mm	in	mm
(1)	5/16	7.9	1/2	12.7	9/16	14.3	7/8	22.2	1 3/8	34.9
(2)	0.251 ±0.001	6.38 ±0.025	0.501 ±0.001	12.73 ±0.025	0.501 ±0.001	12.73 ±0.025	0.626 ±0.001	15.90 ±0.025	1.001 ±0.001	25.43 ±0.025
(3)	0.75	19.1	1.5	38.1	1	25.4	1.25	31	2.5	64
(4)	0.377 ±0.001	9.58 ±0.025	0.627 ±0.001	15.93 ±0.025	0.627 ±0.001	15.93 ±0.025	0.752 ±0.002	19.10 ±0.05	1.380 ±0.002	35.05 ±0.05
(5)	0.75	19.1	1.5	38.1	1.5	38.1	1.5	38.1	2.875	73.03
(6)	1.4375	36.513	2.75	69.9	2.4375	61.913	3.125	79.38	5.75	146.1
(7)	0.4375	11.113	0.75	19.1	0.75	19.1	0.875	22.23	1.625	41.28
(8)	1/4-28	M6x1	1/2-20	M14x2	1/2-20	M14x2	5/8-18	M18x2	1 1/4-12	M36x4

JAM NUTS (U.S. & METRIC)

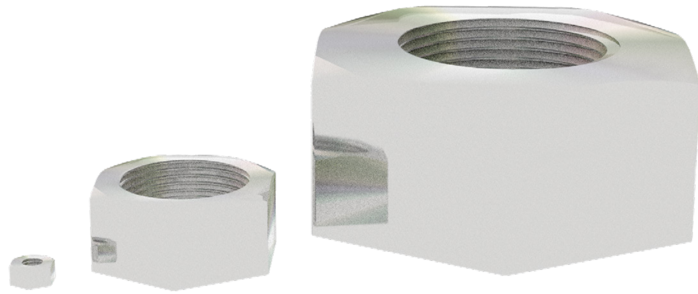
FEATURES & BENEFITS

- U.S.ed with REB's, clevises & calibration adapters
- Flat, parallel surfaces
- Standard thread sizes

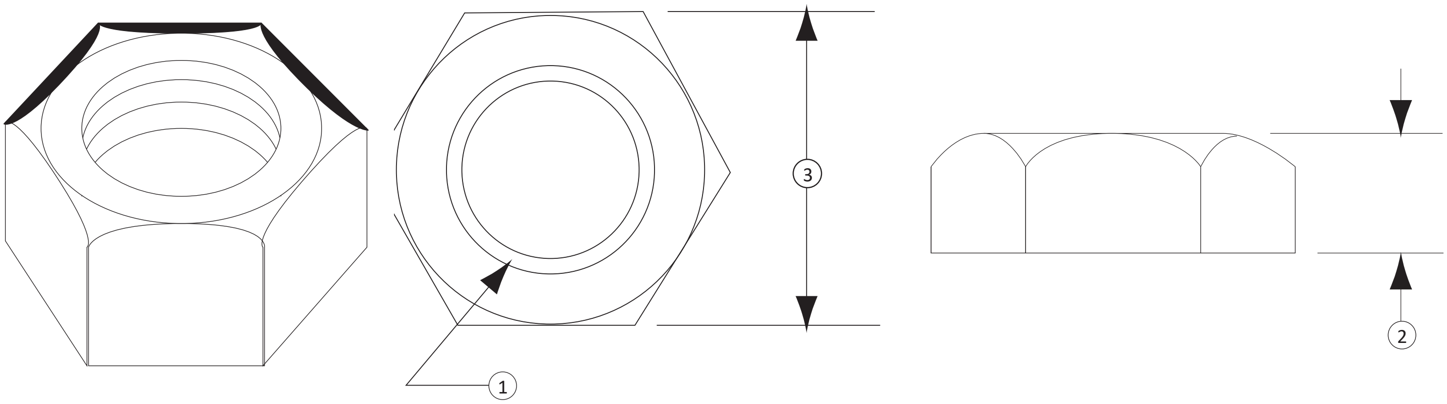
Specifications

MECHANICAL	
Material	Heat treated steel

STANDARD CONFIGURATION



Models JN-101, JN-105, & JN-107 (Shown)



DIMENSIONS

See Drawing	U.S.	Metric	U.S.	Metric	U.S.	Metric	U.S.	Metric	U.S.	Metric	U.S.	Metric	U.S.	Metric
	Model													
	JN-101	JN-201	JN-102	JN-202	JN-103	JN-203	JN-104	JN-204	JN-105	JN-205	JN-106	JN-206	JN-107	JN-207
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
(1)	1/4-28	M6X1	1/2-20	M12X1.75	5/8-18	M16X2	3/4-16	M27X2	1 1/4-12	M33X2	1 3/4-12	M42X2	2 3/4-8	M72X2
(2)	0.219	5.0	0.438	10.0	0.547	13.0	0.641	18.8	0.880	25.4	1.250	31.8	1.900	48.3
(3)	0.438	10.0	0.750	19.0	0.938	24.0	1.125	47.6	1.880	57.0	2.750	70.0	4.250	110.0

INTERFACE
FORCE MEASUREMENT SOLUTIONS.

LOAD BUTTONS (U.S. & METRIC)

FEATURES & BENEFITS

- Converts universal cell to compression only
- Spherical loading surface
- For Low Profile, "S" type and Minibeam

Specifications

MECHANICAL	
Material	Heat treated steel

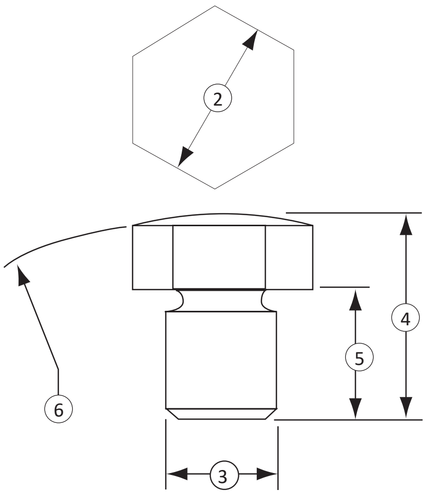


Figure 1

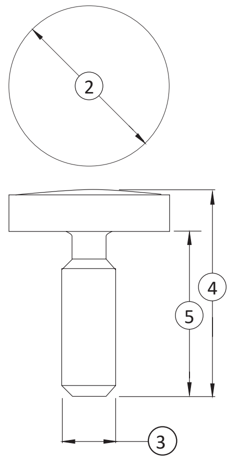


Figure 2

STANDARD CONFIGURATION

Models LB-114, LB-106, LB-111, & LB-104 (Shown)

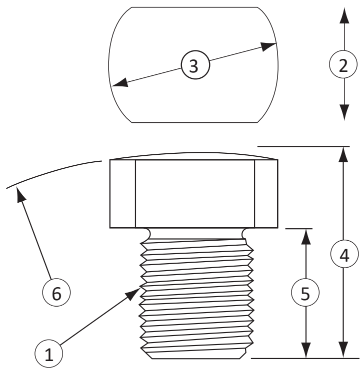


Figure 3

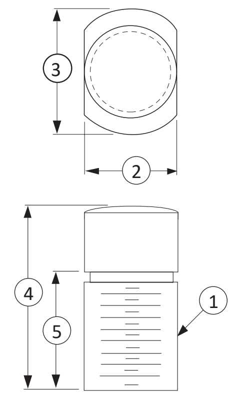


Figure 4

DIMENSIONS

Model	Application	1	2		3		4		5		6		Figure
		Thread	in	mm	in	mm	in	mm	in	mm	in	mm	
LB-106	SM-10 - 250, SSM-50 - 250	¼-28	7⁄16	11.11	½	12.70	⅝	15.88	½	12.70	2	51	3
LB-109	SM-500, 1000 SSM-500 - 3000	½-20	15⁄16	23.81	1 1⁄16	26.99	1 5⁄16	33.34	1	25	4	102	3
LB-110	SSM-5000	⅝-18	15⁄16	23.81	1 1⁄16	26.99	1 5⁄16	33.34	1	25	4	102	3
LB-101	1110 & 1210-300 - 10K	⅝-18	15⁄16	23.81	1 1⁄16	26.99	1 9⁄32	32.54	1	25	4	102	3
LB-102	1120 & 1220-25K, 50K	1 ¼-12	1 ½	38.10	1 ¾	44.45	1 9⁄16	39.69	11⁄16	17.46	6	152	3
LB-103	1132 & 1232-100K	1 ¾-12	2 ⅛	53.98	2 ½	63.50	3 ¾	95.25	2 ⅛	53.98	12	305	3
LB-104	1140 & 1240-200K	2 ¾-8	3 ½	88.90	4	102	5	127	3 ⅛	79.38	12	305	3
LB-111	SSB-500, 1000	0.395	¾	19.05	Ø 0.395	Ø 10.03	¾	19.05	½	12.70	4	102	1
LB-114	MB-All, SSB-50 - 250	0.169	0.50	12.7	Ø 0.169	Ø 4.29	0.63	16.0	0.50	12.7	2	51	2
LB-101M	1110 & 1210-5kN to 50kN	⅝-18 UNF-3A M16x2	15⁄16	23.81	1 1⁄16	26.99	1 9⁄32	32.54	1	25	4	102	3
LB-102M	1120 & 1220-100kN, 250kN	1 ¼-12 UNF-3A M32x2	1 ½	38.10	1 ¾	44.45	1 9⁄16	39.69	11⁄16	17.46	6	152	3
LB-103M	1132 & 1232-450kN	1 ¾-12 UNF-3A M42x2	2 ⅛	53.98	2 ½	63.50	3 ¾	95.25	2 ⅛	53.98	12	305	3
LB-104M	1140 & 1240-900kN	2 ¾-8 UNF-3A M72x2	3 ½	88.90	4	102	5	127	3 ⅛	79.38	12	305	3

A load button may be installed in an INTERFACE universal load cell if it is U.S.ed as a compression cell with the load applied by a plate or other flat surface.

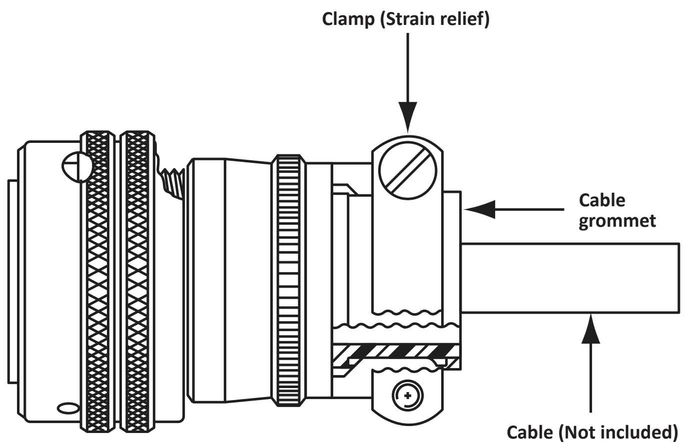
For compression applications only, an INTERFACE compression load cell should U.S.ually be specified. Compression load cells are U.S.ually smaller, less expensive and have an integral load button.

FORCE MEASUREMENT SOLUTIONS

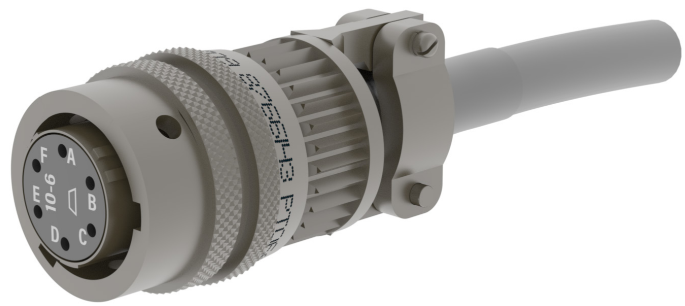
MATING CONNECTORS (U.S. & METRIC)

FEATURES & BENEFITS

- Mating connector & cable
- Dressed pigtails
- Interconnects between load cell & instruments



STANDARD CONFIGURATION



Model PT06A-10-6S (SR) (Shown)

Specifications

Transducer		Mating Connector	
Model	**Receptacle Type**	**Plug Type**	**Order Number**
1000, 1100, 1200 Standard	PC04E-10-6P	PC06W-10-6S	MC-001
1000, 1100, 1200 Bayonet	PT02E-10-6P	PT06A-10-6S (SR)	CN-207
1216	PT02E-12-8P	PT06A-12-8S (SR)	MC-002
1500	PT02E-10-6P	PT06A-10-6S (SR)	CN-207
1600, 1800	PT02E-12-8P	PT06A-12-8S (SR)	MC-002
2420, 2430	PTW1H-10-6P	PT06A-10-6S (SR)	CN-207
2440, 2450	MS3102E-14S-6P	MS3106A-14S-6S	CN-208
2160, 2161	MS3102A-14S-5P	MS3106A-14S-5S	CN-214
5200	PC04E-10-6P	PC06W-10-6S	MC-001
WMC-20K, 30K, 50K	PT02E-10-6P	PT06A-10-6S (SR)	CN-207
SSM	PC04E-10-6P	PC06W-10-6S	MC-001

MOUNTING PLATES FOR LOW PROFILE™ LOAD CELLS (U.S. & METRIC)

FEATURES & BENEFITS

- Distributes the load over the foundation of the supporting structure
- Provides a prepared surface for the load cell
- Eliminates the requirement for expansion assemblies in most installations

Mounting Plates for Low Profile™ Load Cells

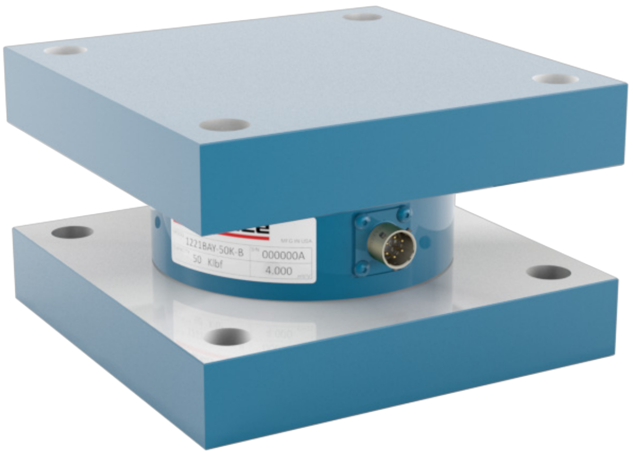
The installation of a compression load cell under a weigh bridge, tank, or other structure normally requires that mounting plates be U.S.ed. The bottom plate, ground flat to 0.0002 T.I.R. to mate with the load cell and fabricated of mild steel, distributes the load over the foundation or supporting structure and provides a prepared surface for the load cell.

The top plate distributes the load to the weighing structure and provides a hard (R_c45) surface for the load button. The top plate will move on the button due to thermal expansion, load shifting, wind loading, and other side loads. The high side load capacity of the Interface load cell eliminates the requirement for expansion assemblies in most installations. Mounting plates are suitable for compression loads only; they will not properly support a universal load cell U.S.ed in tension.

Specifications

MECHANICAL		
Model	TP-101, BP-101 TP-101, BP-108 TP-102, BP-102 TP-103, BP-103 TP-104, BP-104	TP-301, BP-308 TP-302, BP-302 TP-303, BP-303
Material	Heat Treated steel	Stainless steel

STANDARD CONFIGURATION



Models TP-102 & BP-102 with 1221BAY-50K (Shown)

Models BP-102-3 with 1221BAY-50K-B (Shown)

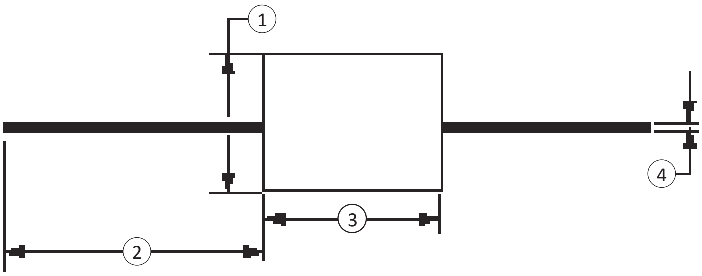
BASE PLATE OPTIONS

Add the dash number after the basic part number of bottom plate to specify exact configuration of the plate and type of mounting screws supplied in the kit.			
Dash #	**Description**	**Pad**	**U.S.age**
-3	Single threaded stud in center	No	Load cell with base installed
-11	Tapped holes and hex head cap screws	Yes	Uncounterbored load cell
-12	Tapped holes and socket head cap screws	Yes	Counterbored load cell
-21	Tapped holes and hex head cap screws	No	Uncounterbored load cell
-22	Tapped holes and socket head cap screws	No	Counterbored load cell

RCAL RESISTORS (U.S. & METRIC)

FEATURES & BENEFITS

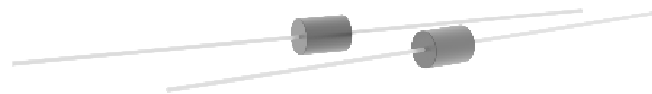
- Precision wire-wound
- 5 ppm/°C, 0.01%
- U.S.ed for shunt calibration



DIMENSIONS

1		2		3		4	
in	mm	in	mm	in	mm	in	mm
Ø 0.25	Ø 6.35	2 TYP	50.8	0.35	8.89	Ø 0.03 TYP	Ø 0.762 TYP

STANDARD CONFIGURATION



Model RS-100-30K (Shown)

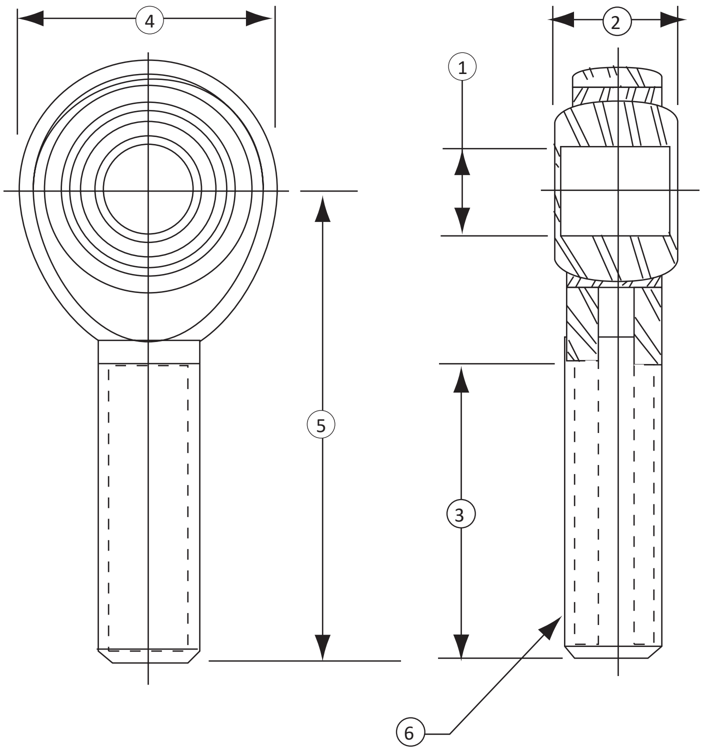
Specifications

Model	Resistance (Kohm)	Application
RS-100-30K	30 ±0.01%	4mV/V Load Cells
RS-100-40K	40 ±0.01%	3mV/V Load Cells
RS-100-60K	60 ±0.01%	2mV/V Load Cells
RS-100-120K	120 ±0.01%	1mV/V Load Cells

ROD END BEARINGS (U.S. & METRIC)

FEATURES & BENEFITS

- For tension applications
- Reduces alignment error
- Metric sizes available



STANDARD CONFIGURATION

Model REB-104 w/JN-101 & REB-102 w/JN-105 (Shown)

Specifications

MECHANICAL	
Material	Heat Treated Steel

DIMENSIONS

Model	Application	Jam Nut Included	1		2		3		4		5		6	
			in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
REB-104	SM-10 - 250, SSM-5O - 250	JN-101	1/4	6.3500	3/8	9.5250	1	25.400	3/4	19.050	1 9/16	39.6875	1/4-28	
REB-106	SM-500, 1000, SSM-500, 1000 SSM-2000, & 3000	JN-102	1/2	12.700	5/8	15.875	1 1/2	38.1000	1 5/16	33.3375	2 7/16	61.9125	1/2-20	
REB-101	1110 & 1210-300 - 10K, SSM-5K	JN-103	5/8	15.875	3/4	19.050	1 5/8	41.2750	1 1/2	38.1000	2 5/8	66.6750	5/8-18	
REB-102	1120 & 1220-25K, 50K	JN-105	1	25.400	1 3/8	34.925	2 11/32	59.5313	2 3/4	69.8500	4 1/8	104.775	1 1/4-12	

NOTE: When connecting a ROD END BEARING directly to a LOAD CELL, U.S.e of the JAM NUT is

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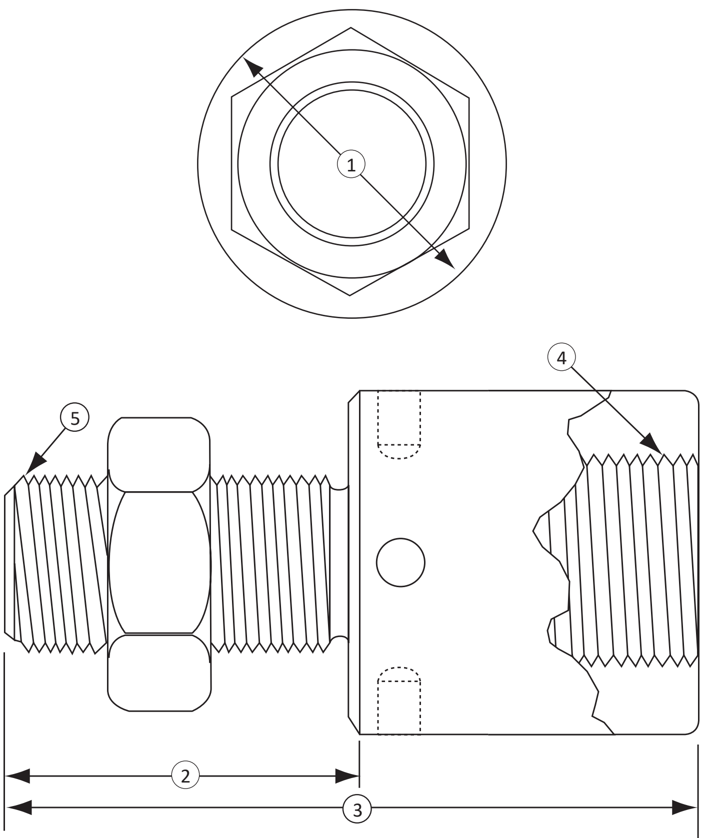
THREAD ADAPTORS (U.S. & METRIC)

FEATURES & BENEFITS

- Adapts male to female
- Common Interface thread sizes
- Adapts one thread size to another



STANDARD CONFIGURATION

Model TA-102 & THD-105 w/JN-107 (Shown)

Specifications

MECHANICAL	
Material	Heat Treated Steel

DIMENSIONS

Model	Jam Nut Included	Application	1		2		3		4	5
			in	mm	in	mm	in	mm	Thread	Male to Female
TA-102	N/A	SM & SSM TO 250	0.75	19.1	0.38	9.7	1.50	38.1	1/2-20x0.63	1/4-28 to 1/2-20
TA-103	N/A	SM & SSM TO 250	0.75	19.1	0.38	9.7	1.50	38.1	3/8-24x0.50	1/4-28 to 3/8-24
TA-106	N/A	SM & SSM TO 250	1.19	30.2	0.44	11.2	1.56	39.6	5/8-18x0.63	1/4-28 to 5/8-18
THD-101	JN-103	LOW PROFILES TO 10K	1.25	31.8	1.75	44.5	3.19	81.0	1/2-20x0.50	5/8-18 to 1/2-20
THD-112	JN-103	LOW PROFILES TO 10K	1.62	41.1	1.75	44.5	4.56	115.8	1-14x1.25	5/8-18 to 1-14
THD-153	JN-105	LOW PROFILES 25K TO 50K	2.00	50.8	2.50	63.5	4.50	114.3	1-14x1.0	1 1/4-12 to 1-14
THD-103	JN-105	LOW PROFILES 25K TO 50K	2.50	63.5	2.34	59.4	4.42	112.3	1 1/2-12x1.40	1 1/4-12 to 1 1/2-12
THD-163	N/A	LOW PROFILES 25K TO 50K	2.50	63.5	1.50	38.1	3.58	90.9	1 1/2-12x1.40	1 1/4-12 to 1 1/2-12
THD-143	JN-105	LOW PROFILES 25K TO 50K	3.38	85.9	2.34	59.4	5.89	149.6	2-12x2.62	1 1/4-12 to 2-12
THD-144	N/A	LOW PROFILES 25K TO 50K	3.38	85.9	1.50	38.1	5.05	128.3	2-12x2.62	1 1/4-12 to 2-12
THD-114	JN-106	LOW PROFILES TO 100K	4.00	101.6	3.75	95.3	9.62	244.3	3-8x4.50	1 3/4-12 to 3-8
THD-115	N/A	LOW PROFILES TO 100K	4.00	101.6	1.75	44.5	7.62	193.5	3-8x4.50	1 3/4-12 to 3-8
THD-105	JN-107	LOW PROFILES TO 200K	5.50	139.7	5.25	133.4	13.0	330	4-8x6.00	2 3/4-8 to 4-8
THD-106	N/A	LOW PROFILES TO 200K	5.50	139.7	2.75	69.9	10.5	267	4-8x6.00	2 3/4-8 to 4-8

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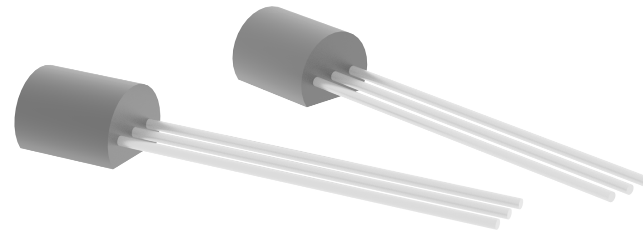
TRANSDUCER ELECTRONIC DATA SHEET (TEDS)

FEATURES & BENEFITS

- Sensor with electronic identification inside
- Meets IEEE 1451.4 Standard for smart transducer interface
- Plug & play ready
- Contains sensor information and calibration data
- Available on new or existing sensors
- Eliminates potential for data entry error
- Simplifies & reduces setup
- Makes swapping of load cells easy
- Increases safety by making certain that the system has the correct sensors
- Can be U.S.ed to identify location of sensors
- Improves inventory control of your sensors
- Sensors can be changed out without jeopardizing integrity of system

STANDARD CONFIGURATION

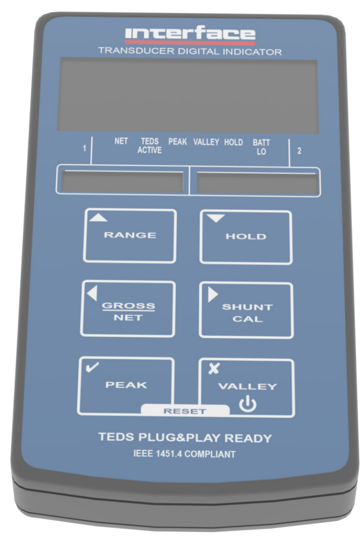


TEDS CHIP (Shown)

IEEE 1451.4 specifies a table of identifying parameters that are stored in the TEDS (Transducer Electronic Data Sheet) template. This template is on an EEPROM inside the load cell or load cell cable that can be accessed by external electronics.

PLUG & PLAY READY INSTRUMENTS

MODEL 9860 - 1 W/9800 - STAND (Shown)



MODEL 9320 - 1 (Shown)

MODEL 9840 - 100 - 1 - T (Shown)

Notes:

Appendix

Transducer Interconnect Cable Assemblies
Electrical Information
Wiring Diagrams
Load Cell Terms and Definitions
Troubleshooting Guide for Interface Load Cells
Load Cell Fatigue Theory
Load Cell Resolution
Grounding and Shielding in Load Cell Installations
Excitation Voltage
Moment Compensation
Temperature Compensation of Zero
Instrument Calibration U.S.ing a Shunt Calibration Resistor
Load Cell Performance as Affected by Cable Length
Proprietary Interface Strain Gages
Warrenty and Repair Policy
Terms and Conditions

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TRANSDUCER INTERCONNECT CABLE ASSEMBLIES

FOR CONNECTING TRANSDUCERS WITH RECEPTACLES TO INSTRUMENTATION

INTERCONNECT CABLE ASSEMBLY

TRANSDUCER	TRANSDUCER END	INSTRUMENT END				
		UNIVERSAL	9820, 9300, SGA, DCA, DMA	9830, 9840	9850	9320
Model	Plug Type	Pigtail	Screw Term	DE-9P	DE-9P	Binder
1000, 1100, 1200 Standard	PC06A-10-6S(SR)	CT-101-10	CT-101-10	CT-173-10	CT-516-10	CT-236-10
1000, 1100, 1200 Bayonet	PC06A-10-6S(SR)	CT-152-10	CT-152-10	CT-175-10	CT-249-10	CT-239-10
1216	PT06A-12-8S(SR)	CT-122-10	CT-122-10	CT-246-10	*	*
1500	PC06A-10-6S(SR)	CT-152-10	CT-152-10	CT-175-10	CT-249-10	CT-239-10
1600, 1800	PT06A-12-8S(SR)	CT-153-10	CT-153-10	CT-177-10	*	CT-237-10
2420, 2430	PC06A-10-6S(SR)	CT-179-10	CT-179-10	CT-254-10	CT-251-10	CT-253-10
2440, 2450	MS3106A-14S-6S	CT-204-10	CT-204-10	CT-260-10	*	CT-252-10
2160, 2161	MS3106A-14S-5S	CT-259-10	CT-259-10	CT-191-10	*	CT-255-10
5200	PC06A-10-6S(SR)	CT-101-10	CT-101-10	CT-173-10	*	CT-236-10
WMC-20K, 30K, 50K	PC06A-10-6S(SR)	CT-179-10	CT-179-10	CT-254-10	*	CT-253-10
SSM	PC06A-10-6S(SR)	CT-101-10	CT-101-10	CT-173-10	*	CT-236-10

CABLE SPECIFICATION FOR ABOVE ASSEMBLIES

NOTE: "CT" prefix on cable assembly order numbers is for the most common polarity which is tension upscale. For compression upscale substitute "CC".

"-10" suffix on cable assembly part number is the most common cable length of 10 ft. Other lengths may be ordered by substituting the desired length in feet.

EXAMPLE: For a 20 ft cable to connect to a model 1221HL-50K transducer and have the convention of the green pigtail as + signal for a compression load, order CC-101-20.

Call factory for more information.

INTERCONNECT CABLE ASSEMBLY

INSTRUMENT		EXTRA MATING PLUG		Order number for extra plug plus installation on end of transducer integral cable	
Model	Receptacle	Type	Order Number	Tension Upscale	Compression Upscale
9320	Binder	Binder	CN-219	MIC-9320-T	MIC-9320-C
9830	DE-9S	DE-9P	CN-212	MIC-9830-T	MIC-9830-C
9840	DE-9S	DE-9P	CN-212	MIC-9840-T	MIC-9840-C
9850	DE-9S	DE-9P	CN-212	MIC-9850-T	MIC-9850-C
500	DE-9S	DE-9P	CN-212	MIC-500-T	MIC-500-C

Instruments not listed use screw terminal connections.

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ELECTRICAL INFORMATION

Load Cell Series	Cell Type	Upscale (4) Mode	Integral Cable Wiring	Std. Cable Type	Cable Length, Feet (5)	Connector Wiring	Mating Connector (2)
1000	Univ.	Tension	W1	A	10	C1	PC06W-10-6S(SR)
1100	Univ.	Tension	W1	A	10	C1	PC06W-10-6S(SR)
1100	Comp.	Tension	W1	A	10	C1	PC06W-10-6S(SR)
1200	Univ.	Tension	W1	A	10	C1	PC06W-10-6S(SR)
1200	Comp.	Tension	W1	A	10	C1	PC06W-10-6S(SR)
1500	Univ.	Tension	-	-	-	C1	PT06A-10-6S(SR)
1600	Univ.	Tension	-	-	-	C2	PT06A-12-8S(SR)
1600	Comp.	Tension	-	-	-	C2	PT06A-12-8S(SR)
1700	Univ.	Tension	-	-	-	C6	PT06A-10-6S(SR)
1800	Univ.	Tension	-	-	-	C2	PT06A-12-8S(SR)
3200	Univ.	Tension	W2	B	20	-	-
3200	Comp.	Tension	W2	B	20	-	-
4200	Comp.	Tension	W2	B	20	-	-
4600	Comp.	Tension	W2	B	20	-	-
5200	Univ.	Tension (1)	W1	A	10	C1	PC06W-10-6S(SR)
SSB	Comp.	Comp.	W2	C	5	-	-
MB, MBP	Comp.	Comp.	W2	C	5	-	-
SM	Univ.	Tension	W2	C	5	-	-
SSM	Univ.	Tension	W2	A	10	C1	PC06W-10-6S(SR)
SMT	Univ.	Tension	W2	D	5	-	-
SPI	Univ.	Comp.	W2	C	5	-	-
SML	Univ.	Tension	W2	D	5	-	-
LBM	Comp.	Tension	W3	G	5	-	-
LBS	Comp.	Tension	W2	G	5	-	-
LW	Comp.	Comp.	W2	-	5	-	-
WeighCheck	Comp.	Tension	W2	B	30	-	-
WMC	Univ.	Tension	W3	G	-	-	-
WMC ≥15K	Univ.	Tension	-	-	-	C3	PT06A-10-6S(SR)
2410-2430	Univ.	Tension	-	-	-	C3	PT06A-10-6S(SR)
2440-2450	Univ.	Tension	-	-	-	C3	MS3106A-145-6S
2100	Univ.	Tension	-	-	-	C4	MS3106A-145-6S
2100	Comp.	Tension	-	-	-	C4	MS3106A-145-6S
MRT	Torque	CW	W2	D	5	-	-
ULC	Univ.	Tension	W2	D	5	-	-
MCC	Comp.	Comp.	W2	E	5	-	-
CX	-	-	-	-	--	C5	PT06A-12-8S(SR)

Note:
1) ThrU.S.t axis only.
2) Mating connector for the stock version of cell. Consult factory for alternate connectors and specials.
3) Consult factory. Several connectors and mating cable types are available.
4) Indicates the loading direction which caU.S.es a positive output.
5) Stock length; other lengths available on special order.

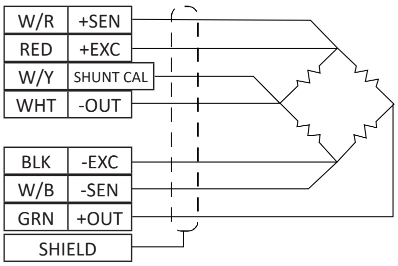
LOAD CELL INTEGRAL CABLES				
Cable Type	Wire Size	No. of Wires	Shield	Description
A	22 AWG	7	Braid	Heavy-duty, PVC jacket
B	22 AWG	4	Braid	Heavy-duty, polyurethane jacket
C	28 AWG	4	Braid	Tough, clear PVC jacket
D	28 AWG	4	Spiral	Ultra-flexible, black PVC jacket
E	30 AWG	4	Braid	Ultra-flexible, gray PVC jacket
F	20 AWG	4	Braid	Teflon jacket
G	30 AWG	4	Braid	Teflon jacket

interface
FORCE MEASUREMENT SOLUTIONS

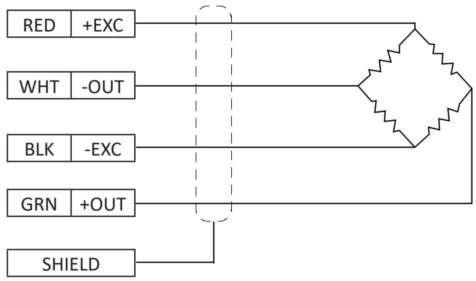
ELECTRICAL INFORMATION

LOAD CELL CABLE WIRING

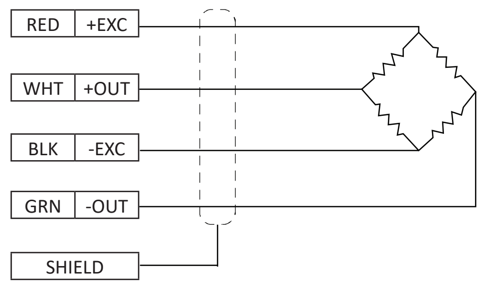
W1



W2

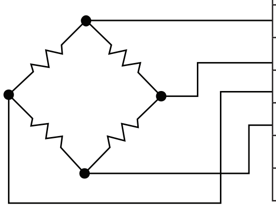


W3



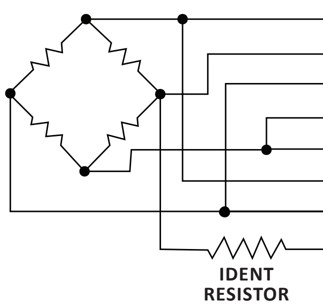
LOAD CELL CONNECTOR WIRING

C1



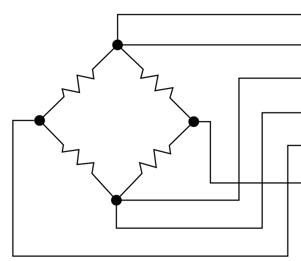
PIN	FUNCTION
A	+EXC
B	+OUT
C	-OUT
D	-EXC
E	N/C
F	N/C

C2



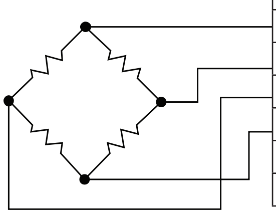
PIN	FUNCTION
A	+EXC
B	+OUT
C	-OUT
D	-EXC
E	-SEN
F	+SEN
G	-SHUNTCAL
H	IDENT R

C3



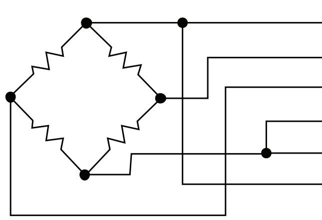
PIN	FUNCTION
A	+EXC
B	+SEN
C	-EXC
D	-SEN
E	-OUT
F	+OUT

C1 with TEDS option



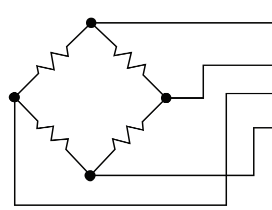
PIN	FUNCTION
A	+EXC
B	+OUT
C	-OUT
D	-EXC
E	TEDS DATA
F	TEDS GND

C2 with TEDS option



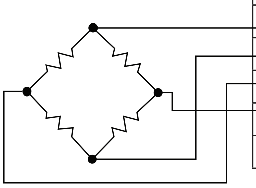
PIN	FUNCTION
A	+EXC
B	+OUT
C	-OUT
D	-EXC
E	-SEN
F	+SEN
G	TEDS DATA
H	TEDS GND

C3 with TEDS option



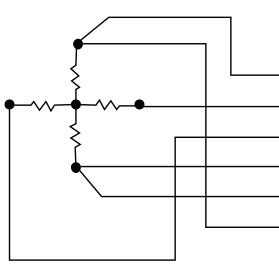
PIN	FUNCTION
A	+EXC
B	+OUT
C	-OUT
D	-EXC
E	TEDS DATA
F	TEDS GND

C4



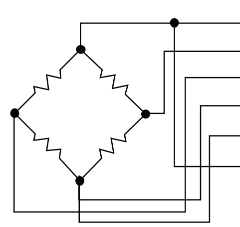
PIN	FUNCTION
A	+EXC
B	-EXC
C	-OUT
D	+OUT
E	N/C

C5



PIN	FUNCTION
A	+EXC
B	+OUT
C	-OUT
D	-EXC
E	-SEN
F	+SEN
G	N/C
H	N/C

C6



PIN	FUNCTION
A	+EXC
B	+OUT
C	-OUT
D	-EXC
E	-SEN
F	+SEN

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LOAD CELL TERMS AND DEFINITIONS

This document defines the terminology and performance parameters pertaining to engineering Specifications of load cell products. The objective of this terminology Standard is to promote effective communication of Specifications and to constitute a reference for uniformity. The definitions herein are generally compatible with common understanding in the load cell community and are an expansion of those found in "Load Cell Terminology and Test Procedure Recommendations," Third Edition, 1985, Scale Manufacturers Association, and in OIML International Recommendation R60, 1991 Edition. This document includes modifications to the definitions in the above referenced Standards to correct some of their inconsistencies and inadequacies.

For convenience, terms which are defined in this Standard are printed in upper case when U.S.ed in the definition of another term.

AMBIENT Temperature
The Temperature of the medium surrounding the LOAD CELL.

AXIAL LOAD
A load applied along the PRIMARY AXIS.

BAROMetric SENSITIVITY
The change in ZERO BALANCE due to a change in ambient baroMetric pressure. Normally expressed in units of %RO/atm.

CALIBRATION
The comparison of LOAD CELL OUTPUT against Standard test loads.

CAPACITY
The maximum AXIAL LOAD a LOAD CELL is designed to measure within its Specifications.

COMBINED ERROR
The maximum deviation of the CALIBRATION curve from the straight line drawn between MINIMUM LOAD OUTPUT and MAXIMUM LOAD OUTPUT, normally expressed in units of %FS. Both ascending and descending curves are considered.

CREEP
The change in LOAD CELL SIGNAL occurring with time while under load and with all environmental conditions and other variables remaining constant. Normally expressed in units of % of applied load over a specified time interval. It is common for characterization to be measured with a constant load at or near CAPACITY.

CREEP RECOVERY
The change in LOAD CELL SIGNAL occurring with time immediately after removal of a load which had been applied for a specified time interval, environmental conditions and other variables remaining constant during the loaded and unloaded intervals. Normally expressed in units of % of applied load over a specified time interval. Normally the applied interval and the recovery interval are equal. It is common for characterization to be measured with a constant load at or near CAPACITY.

CREEP RETURN
The difference between LOAD CELL SIGNAL immediately after removal of a load which had been applied for a specified time interval, environmental conditions and other variables remaining constant during the loaded interval, and the SIGNAL before application of the load. Normally expressed in units of % of applied load over a specified time interval. It is common for characterization to be measured with a constant load at or near CAPACITY.

DEFLECTION
The displacement of the point of AXIAL LOAD application in the PRIMARY AXIS between the MDL and MDL+CAPACITY load conditions.

ECCENTRIC LOAD
Any load applied parallel to but not concentric with the PRIMARY AXIS.

FULL SCALE or FS
The OUTPUT corresponding to MAXIMUM LOAD in any specific test or application.

HYSTERESIS
The algebraic difference between OUTPUT at a given load descending from MAXIMUM LOAD and OUTPUT at the same load ascending from MINIMUM LOAD. Normally expressed in units of %FS. It is common for characterization to be measured at 40-60% FS.

INPUT RESISTANCE
The resistance of the LOAD CELL circuit measured at the excitation terminals with no load applied and with the output terminals open-circuited.

INSULATION RESISTANCE
The DC resistance measured between the bridge circuit and the case. Normally measured at 50 VDC.

LOAD CELL
A device which produces an OUTPUT proportional to an applied force load.

MAXIMUM AXIAL LOAD, SAFE
The maximum AXIAL LOAD which can be applied without producing a permanent shift in performance characteristics beyond those specified. Normally expressed in units of % CAPACITY.

MAXIMUM LOAD
The highest load in a specific test or application, which may be any load up to and including CAPACITY + MINIMUM LOAD, but may not exceed CAPACITY significantly.

MAXIMUM AXIAL LOAD, ULTIMATE
The maximum AXIAL LOAD which can be applied without producing a structural failure. Normally expressed in units of % CAPACITY.

LOAD CELL TERMS AND DEFINITIONS

MAXIMUM LOAD AXIS MOMENT, SAFE
The maximum moment with respect to the PRIMARY AXIS which can be applied without producing a permanent shift in performance characteristics beyond those specified.

MAXIMUM MOUNTING TORQUE, SAFE
The maximum torque which can be applied concentric with the primary axis without producing a permanent shift in performance characteristics beyond those specified.

MAXIMUM SIDE LOAD, SAFE
The maximum SIDE LOAD which can be applied without producing a permanent shift in performance characteristics beyond those specified.

MEASURING RANGE
The difference between MAXIMUM LOAD and MINIMUM LOAD in a specific test or application. It may not exceed CAPACITY.

MINIMUM DEAD LOAD or MDL
The smallest load for which specified performance will be met. It is normally equal to or near NO LOAD in single mode apwplications and is of necessity equal to NO LOAD in double mode applications.

MINIMUM LOAD
The lowest load in a specific test or application, differing from NO LOAD by the weight of fixtures and load receptors which are attached plU.S. any intentional pre-load which is applied.

MODE
The direction of load. Tension & compression are each one mode.

NATURAL FREQUENCY
The frequency of free oscillations under conditions of NO LOAD.

NO LOAD
The condition of the LOAD CELL when in its normal physical orientation, with no force input applied, and with no fixtures or load receptors attached.

NONLINEARITY
The algebraic difference between OUTPUT at a specific load and the corresponding point on the straight line drawn between MINIMUM LOAD and MAXIMUM LOAD. Normally expressed in units of %FS. It is common for characterization to be measured at 40-60 %FS.

NONREPEATABILITY
The maximum difference between OUTPUT readings for repeated loadings under identical loading and environmental conditions. Normally expressed in units of %RO.

OUTPUT
The algebraic difference between the SIGNAL at applied load and the SIGNAL at MINIMUM LOAD.

OUTPUT RESISTANCE
The resistance of the LOAD CELL circuit measured at the SIGNAL terminals with no load applied and with the excitation terminals open-circuited.

PRIMARY AXIS
The axis along which the LOAD CELL is designed to be loaded.

RATED OUTPUT or RO
The OUTPUT corresponding to CAPACITY, equal to the algebraic difference between the SIGNAL at (MINIMUM LOAD + CAPACITY) and the SIGNAL at MINIMUM LOAD.

RESOLUTION
The smallest change in load which produces a detectable change in the SIGNAL.

SHUNT CALIBRATION
Electrical simulation of OUTPUT by connection of shunt resistors of known values at appropriate points in the circuitry.

SIDE LOAD
Any load at the point of AXIAL LOAD application acting at 90˚ to the PRIMARY AXIS.

SIGNAL
The absolute level of the measurable quantity into which a force input is converted.

SPAN
Another name for RATED OUTPUT.

STATIC ERROR BAND or SEB
The band of maximum deviations of the ascending and descending calibration points from a best fit line through zero OUTPUT. It includes the effects of NONLINEARITY, HYSTERESIS, and non-return to MINIMUM LOAD. Normally expressed in units of %FS.

SEB OUTPUT
A computed value for OUTPUT at CAPACITY derived from a line best fit to the actual ascending and descending calibration points and through zero OUTPUT.

SYMMETRY ERROR
The algebraic difference between the RATED OUTPUT in tension and the average of the absolute values of RATED OUTPUT in tension and RATED OUTPUT in compression. Normally expressed in units of %RO.

Temperature EFFECT ON OUTPUT
The change in OUTPUT due to a change in AMBIENT Temperature. Normally expressed as the slope of a chord spanning the COMPENSATED Temperature RANGE and in units of %/°F or %/100°F.

Temperature EFFECT ON ZERO
The change in ZERO BALANCE due to a change in AMBIENT Temperature. Normally expressed as the slope of a chord spanning the COMPENSATED Temperature RANGE and in units of %RO/°F or %RO/100°F.

LOAD CELL TERMS AND DEFINITIONS

Temperature RANGE, COMPENSATED
The range of Temperature over which the LOAD CELL is compensated to maintain OUTPUT and ZERO BALANCE within specified limits.

Temperature RANGE, OPERATING
The extremes of AMBIENT Temperature within which the LOAD CELL will operate without permanent adverse change to any of its performance characteristics.

TOGGLE
Another name for ZERO FLOAT.

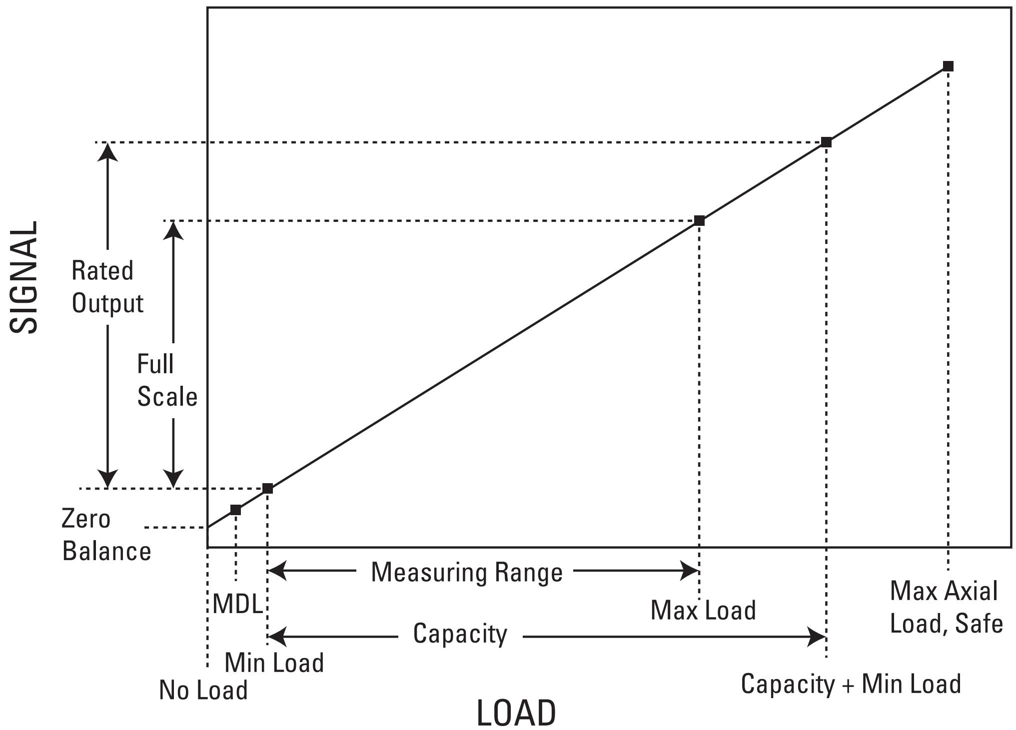
ZERO BALANCE
The SIGNAL of the LOAD CELL in the NO LOAD condition.

ZERO DEAD BAND
Another name for ZERO FLOAT.

ZERO FLOAT
The shift in ZERO BALANCE resulting from a complete cycle of equal tension & compression loads. Normally expressed in units of %FS and U.S.ually characterized at FS = CAPACITY.

ZERO STABILITY
The degree to which ZERO BALANCE is maintained over a specified period of time with all environmental conditions, loading history, and other variables remaining constant.

ILLUSTRATION OF TERMS



ABBREVIATIONS

(All abbreviations are case-specific, are not to be pluralized, and do not U.S.e trailing periods.)

A	ampere	kgf	kilogram force	lb	pound
CE	combined error	kN	kilonewton	lb-in	pound-inch
˚C	degree CelsiU.S.	K	kilopound (kip)	lb-ft	pound-foot
˚F	degree Fahrenheit	K	lbf kilopound force	lbf	pound force
˚K	degree Kelvin	MN	meganewton	psi	pound per square inch
ft	foot	m	meter	RO	rated output
ft-lb	foot-pound	mA	milliampere	SEB	static error band
FS	full scale	mm	millimeter	t	ton, Metric
g	gram	mV	millivolt	V	volt
Hz	hertz	mV/V	millivolt/volt	VDC	volt direct current
in	inch	MDL	minimum dead load	VAC	volt alternating current
in-lb	inch-pound	N	newton	WA	watt
kg	kilogram	Nm	newton-meter		

TROUBLESHOOTING GUIDE FOR LOAD CELLS

1. INTRODUCTION

Performance of a load cell force (or weigh) measurement system is dependent upon the integrity of the physical installation, correct interconnection of the components, proper performance of the basic components which make up the system, and calibration of the system. Presuming that the installation was originally operating and was calibrated, troubleshooting can begin by checking the components individually to determine if they have been damaged or have failed.

The basic components are:

- Load cells
- Mechanical supports and load connections
- Interconnecting cables
- Junction boxes
- Signal conditioning electronics

1.1 MECHANICAL INSTALLATION

Load Cells which are not mounted in accordance with the manufacturer's recommendations may not perform to manufacturer's Specifications. It is always worthwhile to check:

- Mounting surfaces for cleanliness, flatness, and alignment
- Torque of all mounting hardware
- Load cell orientation: "Dead" end on mechanical reference or load forcing source, "live" end connected to the load to be measured. (Dead end is the end closest mechanically to the cable exit or connector.)

Proper hardware (thread sizes, jam nuts, swivels, etc) as required to connect the load to the load cell. A fundamental requirement is that there be one, and only one load path! This load path mU.S.t be through the load axis of the load cell. This may sound elementary, however it is a commonly overlooked problem.

1.2 Electrical INSTALLATION

Proper load cell performance is also dependent upon the Electrical "system." The following items are common problem areas:

- Loose or dirty Electrical connections, or incorrect connection of color coded wires.
- Failure to make U.S.e of remote sensing of excitation voltage on long cables.
- Incorrect setting of excitation voltage. (The best setting is 10 VDC, becaU.S.e that voltage is U.S.ed to calibrate the load cell in the factory. The maximum voltage allowed is 15 or 20 volts, depending on the model. Some battery-operated signal conditioners U.S.e smaller voltages, down to 1.25 volts, to conserve battery power.)

Loading of the bridge circuit. (Highly accurate load cell systems require highly accurate read-out instruments. Such instruments typically have very high input impedances to avoid circuit loading errors.)

2. LOAD CELL EVALUATIONS

It is quite easy to make a quick diagnostic check of a load cell. The procedure is quite simple and a minimum of equipment is required. Should it be determined that the load cell is at fault, the unit should be returned to the factory for further evaluation and repair as may be required. Many of the checks may be performed with an ohmmeter.

2.1 CHECK BRIDGE CIRCUITRY AND ZERO BALANCE

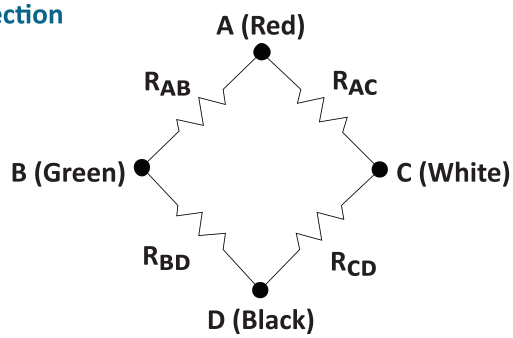
(Numbers apply to Standard 350 ohm bridges.)

- Instrument required: Ohmmeter with 0.1 ohms resolution in the range of 250-400 ohms.
- Bridge Input Resistance: RAD should be 350 ±3.5 ohms (unless the cell has "Standardized output," in which case the resistance should be less than 390 ohms)

TROUBLESHOOTING GUIDE FOR LOAD CELLS

- Bridge Output Resistance: RBC should be 350 ±3.5 ohms
- Bridge Leg Resistances: Comparing the leg resistances at no load permits evaluation of the caU.S.e of any permanent damage in the load cell flexure. The “computed unbalance” of the bridge shows the general condition of the cell.
- The computed unbalance, in units of “mV/V,” is determined as follows: Unbalance = 1.4 • (RAC – RAB + RBD – RCD)
- The Zero Offset, in units of “% of Rated Output”, is determined as follows: Zero Offset = 100 • Unbalance ÷ Rated Output

Typical Connection



If the ohmmeter resolution is 0.1 ohm or better, then a computed Zero Offset of greater than 20 percent is a clear indication of overload. A computed zero balance of 10-20% is an indication of probable overload. If the load cell has been overloaded, mechanical damage has been done that is not repairable, becaU.S.e overloading results in permanent deformation within the flexural element and gages, destroying the carefully balanced processing that results in performance to Interface Specifications. While it is possible to Electrically re-zero a load cell following overload, it is not recommended becaU.S.e this does nothing to restore the affected performance parameters or the degradation to structural integrity.

If the degree of overload is not severe the cell may in some cases be U.S.ed at the U.S.er’s discretion, although some performance parameters may violate Specifications and the cyclic life of the load cell may be reduced.

2.2 INSULATION RESISTANCE TESTS

- Insulation resistance, shield to conductors: Connect all the conductors together, and measure the resistance between all those wires and the shield in the cable.
- Insulation resistance, load cell flexure to conductors: Connect all the conductors together, and measure the resistance between all those wires and the metal body of the load cell.

The tests described above can be performed U.S.ing a Standard ohm meter, although best results are obtained with a megohm meter. If resistance is beyond the Standard ohmmeter range, about 10 megohms, the cell is probably OK. However, some kinds of Electrical shorts show up only when U.S.ing a megohm meter or with voltages higher than most ohmmeters can supply.

CAUTION:

Never U.S.e a voltage higher than 50 VDC or 35 VRMS AC to measure insulation resistance, or breakdown of the insulation between the gages and the flexure may result. Low resistance (below 5000 megohms) is often caU.S.ed by moisture or pinched wires. The caU.S.e and extent of damage mU.S.t be established at the factory to determine if the load cell may be salvaged.

3. FACTORY EVALUATION

If the load cell is defective for reasons other than overload, return to factory for detailed evaluation. Factory evaluation may show that the cell is repairable or non-repairable and if repair or replacement will be under warranty. If non-warranty, the cU.S.tomer will be contacted with the cost of repairs and recalibration, and a delivery date after receipt of authorization to proceed.

FORCE MEASUREMENT SOLUTIONS.

LOAD CELLS FATIGUE THEORY

BACKGROUND

Interface has specialized in fatigue-rated load cells and their applications since its founding in 1968. Fatigue rating is a distinct specification which guarantees the cU.S.tomer a load cell which has a service life of 100 million fully reversed loading cycles at full rated capacity.

The very first products at Interface were fatigue-rated load cells, and over the years a history has been built up by thoU.S.ands of cells in U.S.e all over the world. Many have been supplied to major manufacturers of materials test machines and to major aerospace manufacturers, for U.S.e in long term structural fatigue test programs on aircraft, space, and automotive equipment. **No fatigue failure of any fatigue-rated Interface load cell, U.S.ed within its ratings, has ever been reported.**

FATIGUE FAILURE THEORY

It is well known that metals will fail in a statically loaded situation if the yield strength is exceeded. In as much as load cells are structural members which are stressed in the course of their normal U.S.e, they are commonly given ultimate overload ratings in an effort to characterize the magnitude of static load they will withstand without failing structurally.

However, all metal structures, including load cells, are also subject to failure as a result of repetitive loadings which are much lower than the ultimate overload rating. This phenomenon is known as a fatigue failure, and it is due to the fact that the stress which a metal can withstand under cyclic loading U.S.ually becomes less and less as the number of cyclic loadings is increased.

The caU.S.e of this apparent anomaly can be explained by noting that metals are typically not perfectly homogeneoU.S. solids. They are composed of crystals, and at locations called grain boundaries, along slip planes or in a region of a microscopic defect there can be minute strains under load which do not completely reverse during unload, leaving the material with a slight plastic deformation at the end of each complete cycle. This effect is highly dependent on the magnitude of the load and the number of cycles.

ANATOMY OF A FATIGUE FAILURE

It is generally acknowledged that a structural fatigue failure develops in three stages:

1. Repeated cycling builds up local plastic deformation, and a microscopic crack is initiated.
2. The crack propagates and a larger section becomes weakened.
3. Stress concentration in the section of cracking increases rapidly, and continued cycling enlarges the crack until sudden fracture occurs.

FATIGUE LIFE PREDICTION

Accurate prediction of fatigue life of any structure is not a reality. Well controlled tests on the most simple configurations of test specimens result in a wide scatter band of results. With complex structures typical of a load cell, analysis is even more complex. Theoretical analysis can produce approximations, however, which can be U.S.eful in estimating the margin of safety at which a particular load cell design is operating.

In materials science, the S-N curve is a well known tool. It is a graphical representation of the number of load cycles required to break a specimen, at a range of peak cyclic stress levels. S-N curves for the high quality materials U.S.ed in Interface load cells have been experimentally determined, and are shown in Figure 1 for stainless steel and alloy steel, and in Figure 2 for aluminum alloy.

ThU.S., if the stress level is known, the fatigue life can be approximately known. However, there are factors which make fatigue life difficult to characterize.

LOAD CELL FATIGUE FAILURE MODES

COMPONENTS SUBJECT TO FAILURE

There are two metal components in a load cell that mU.S.t be considered in fatigue analysis, the flexure (spring element) and the strain gage (sensor).

1. The flexure bears the load; therefore failure of the flexure is structural.
2. Since the gages function is Electrical measurement of minute deflections, failure of the strain gages, on the other hand, is typically not structural; failure is noted by a shift in resistance or gage factor.

The relative propensity to first encounter flexure or strain gage fatigue failure depends upon the design of the transducer.

FORCE MEASUREMENT SOLUTIONS.

LOAD CELLS FATIGUE THEORY

FLEXURES

There are several metals U.S.ed for flexures in Interface load cells including aircraft quality alloy steel, stainless steel, and high strength fatigue-resistant aluminum alloy. S-N curves for these three materials are presented in Figure 1 and Figure 2.

Stress is normally expressed in units of psi (pounds per square inch), but for convenience we U.S.e units of Ksi which are equal to 1000 psi. Shear stress is on the vertical axis, corresponding to the state of stress in Low Profile load cells. Readers with some materials science familiarity will recognize that classical fatigue strength for these materials is higher than indicated in the figures. This is becaU.S.e classical data is for bending or direct stress, whereas Interface fatigue-rated cells operate in shear mode. This analysis therefore appropriately U.S.es the required factor for shear, avoiding a falsely optimistic result.

Note that the shear S-N curve for steel becomes essentially flat at about 55 KSI. This is a characteristic of steel. The stress level at the flat portion of the curve is called the endurance limit. If operated below this limit, theoretically the material will endure an infinite number of load cycles. NonferroU.S. metals do not generally exhibit an endurance limit, their curves continuing on with a small slope.

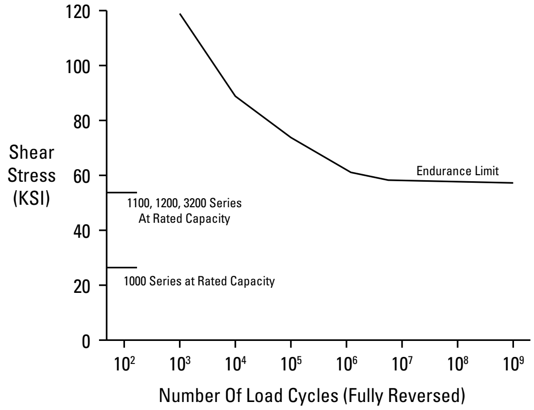


Fig 1. S-N Curve, Interface Alloy Steel & Stainless Steel

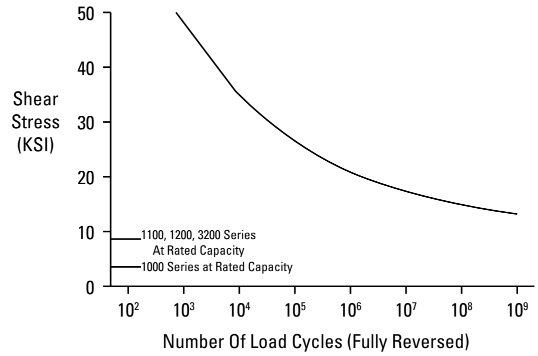


Fig 2. S-N Curve, Interface Aluminum

GAGES

Interface strain gages are specially made of fatigue-resistant nickel-chromium alloy. Strain gage fatigue characteristics are most conveniently viewed in terms of strain rather than stress. Figure 3 shows a Strain-N curve for Interface strain gage material. Strain is a dimensionless quantity of normally very small magnitude. The microstrain unit is simply 106 strain units and is U.S.ed for convenience. Stress and strain for any particular material are related by a constant which is the modulU.S. of elasticity (30X106 for steel and 10X106 for aluminum), allowing convenient comparison of S-N curves and Strain-N curves.

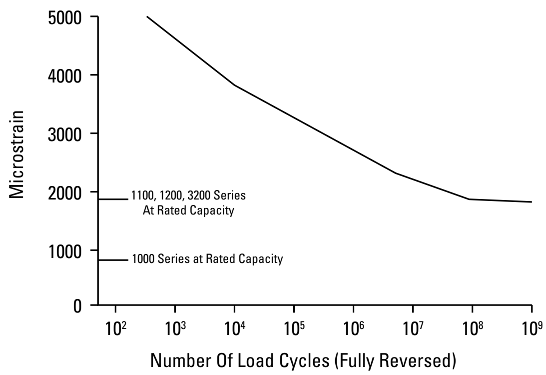


Fig 3. S-N Curve, Interface Strain Gages

NOTE:

The curves in Figures 1, 2, and 3 are for fully reversed load cycles, meaning that for 2000 microstrain as an example, a cycle starts at zero load and consists of one load to (+2000), one load to (-2000), with a return to zero.

COMPARISON OF LOADING LEVELS

Superimposed on the curves are operating levels of Interface Low Profile load cells by model series. This provides a convenient visualization of the fact that all of these load cells are designed to have very long, if not infinite, theoretical fatigue lives. Remember that in actual practice things are not necessarily so ideal. Therefore, in order to establish the correlation between theoretical and realizable fatigue life, actual test results are desirable.

LOAD CELLS FATIGUE THEORY

DESIGN VERIFICATION TESTS

TEST PROTOCOL

Interface conducted Design Verification Tests to substantiate the theoretical life predictions by means of actual load tests of the product. ObvioU.S.ly, building up millions of load cycles on a high capacity load cell is not a trivial task. Many hours of costly machine time are required. Tests were conducted on three representative Interface Low Profile load cells: (1) an aluminum cell of 5,500 lbf capacity, (2) a steel cell of 11,000 lbf capacity, and (3) a steel cell of 22,000 lbf capacity.

Loading to 130% of rating was selected as an acceleration factor, to bring down the test time to a realizable length, since 100 million cycles at 1 hertz and 100% loading would consume 3 years and 2 months of testing, 24 hours per day. Based on the slopes of the S-N curves, a cycle acceleration factor of at least 10 can be achieved with 130% loading, thU.S. ensuring that the more stringent test at 107 cycles will prove a fatigue life of 108 cycles at 100% loading.

TEST RESULTS

Analysis of the test data showed that there were no indications of fatigue failure nor degradation of load cell performance outside specified limits, for the critical load cell parameters of output, zero balance, nonlinearity, hysteresis, and creep, during or after completion of the Verification Test program.

BENEFITS OF REDUCED STRESS LEVELS

LOWER STRESS BY DESIGN

Interface load cells are designed for optimum fatigue life. Other load cells are not necessarily equivalent. Table 1 below is a comparison of actual strain levels in Low Profile™ and typical competitive load cells. The safety factors are a means of visualizing the design merit of the varioU.S. designs. The value of fatigue rated load cells for fatigue applications is evident from the safety factor data. It is also apparent that Interface load cells with 4 mV/V output have lower stress levels and, therefore, more fatigue resistance than competitors' cells, even though their output is only 3 mV/V or less.

LOWER STRESS BY U.S.ER LIMITS

Note that the tests and S-N curves are based on fully reversed load cycles. This type of loading cycle is considerably more stringent than unidirectional loading, which is the more common application of load cells. If a fatigue load cell is repeatedly loaded in only one direction, the Goodman Law predicts that it can be loaded to about 133% of the bidirectional fatigue-rated capacity with no degradation of its fatigue rating. Conversely, unidirectional loading to a fatigue cell's rated capacity is much less stressful on the cell than bidirectional loading and can be expected to yield a fatigue life well beyond the number of cycles which could be reasonably and economically applied in a verification test program.

Design Characteristic	Interface 1000 Series (Fatigue)	Interface 1000 Series (Fatigue)	Interface 1100 Series & 1200 Series	Interface 1100, 1200, 3200, 4200, & 4600 Series	Competition Generic Load Cell
	Aluminum	Steel	Aluminum	Steel	Steel
Output, mV/V	1	2	3	4	3
Fatigue Life Rating (Cycles)	10^8	10^8			?
Microstrain at Rated Capacity	450	900	900	1800	1790 (1)
Max Microstrain on Flexture Allowed for 108 Cycle Life	1400	1850	1400	1850	1850
Max Microstrain on Gages Allowed for 108 Cycle Life	2000	2000	2000	2000	1400 (2)
Safety Factor, Flexture (Rotation Allowed / Actual Strain)	3.1	2.1	1.6	1.0	1.0
Safety Factor, Gages (Ratio Allowed / Actual Strain)	4.4	2.2	2.2	1.1	0.8

Table 1. Load Cell Strain and Safety Factor Comparison

NOTE:

1. ***In typical competitors' load cells, the copper-nickel alloy gages have approximately 20% lower Gage Factor than Interface gages and lose approximately 10% of their natural output to Temperature compensation circuitry, a loss which is not present with Interface self-compensated gages. The result is that generic 3 mV/V load cells are stressed about equally with Interface 4 mV/V load cells.***
2. ***Typical copper-nickel alloy gages have approximately 70% of the fatigue resistance of Interface nickel-chromium alloy gages.***

LOAD CELL RESOLUTION

Load cells are constructed U.S.ing electric resistance metal foil strain gages bonded to an elastic flexure element. The load cell is a passive analog device with continuoU.S. resolution limited ultimately by noise, due to electron motion on the order of 10-9 volts (1 nanovolt). Therefore, practically speaking, resolution is limited by the type and quality of the electronic instrumentation U.S.ed, rather than by the load cell itself. Many reasonably priced instruments can resolve 0.8 to 1.0 microvolt/count as a minimum signal level.

For example, consider a load cell with Rated Output of 3mV/V. Assume that 10VDC excitation is U.S.ed. At Rated Output, the signal level produced would be:

3mV/V x 10V = 30 mV

If the indicating instrument can resolve 1 microvolt in the rightmost digit of the display, then:

$$\text{Resolution} = \frac{1\ \mu\text{volt}}{30\ \text{mV}}$$

$$= \frac{1\ \mu\text{volt}}{30{,}000\ \mu\text{volt}}$$

= 0.000033, fraction of Rated Output

= 0.0033 % of Rated Output

If, for example, an MB-5 (5 lbf Rated Capacity) load cell were being U.S.ed, the resolution in pounds could be calculated as:

Resolution = 5 lbf x 0.000033

= 0.00017 lbf

If an instrument capable of 0.5 microvolt resolution were U.S.ed, the resolution would be approximately 1 part in 60,000 or 0.000083 pounds for the 5 pound capacity cell. Maximum resolution may be limited by the instrument to the total number of counts that can be displayed.

Another typical example would be the case where only a portion of the range of the load cell is to be U.S.ed. If the maximum load on the MB-5 were to be 3 pounds, then the output would be:

3 mV/V x 3 lbf / 5 lbf =

1.8 mV/V

U.S.ing 10V excitation provides a signal of 18 mV output for 3 pounds input. If the instrument displays is to display 30,000 counts a signal strength of

18 mV / 30,000 counts =

0.6 microvolt/count

results in a display of 0.00015 pound/count resolution. Of course, the instrument mU.S.t have a sensitivity of at least 0.6 µvolt/count for this example.

It can be seen from the above examples that the sensitivity and stability of the electronic instrumentation is critical, when high resolution is required. High electronic gain alone will not achieve good results if the zero stability or gain stability is poor becaU.S.e the readings will drift with time or Temperature changes.

Also, keep in mind that excessive resolution can be detrimental in situations where the stability of the applied force is low, as in some hydraulic systems.

Generally, it is desired to read physical units instead of counts. Most instruments provide a count-by feature of 1, 2, 5 or 10 to facilitate this. For the above example, an instrument could be set up to read 30,000 counts by 2 for the 3 pound load, providing resolution of 0.0002 lbf Premium instruments are available that offer as good as 0.001µvolt/count.

GROUNDING AND SHIELDING IN LOAD CELL INSTALLATIONS

Proper grounding and shielding can be critical to the successful application of load cells generating low level signals. There is no "best way" to set up all systems and the specifics of the installation and associated instrumentation mU.S.t be considered in arriving at a system configuration that is satisfactory.

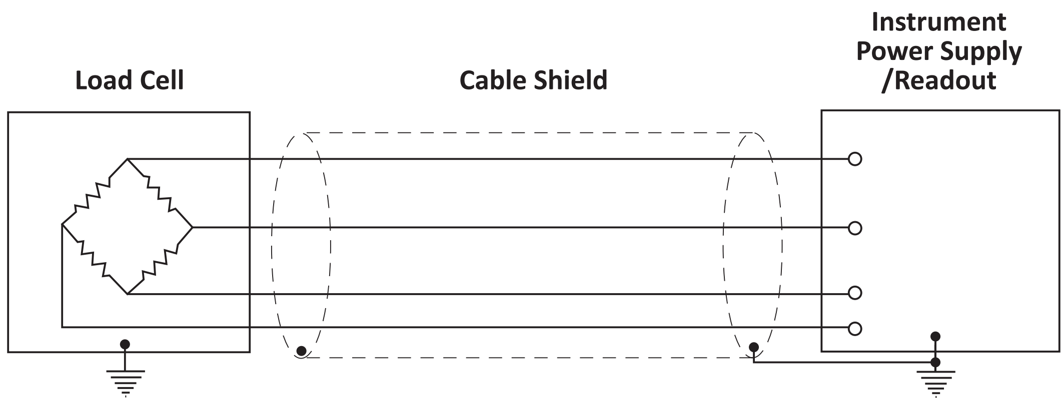
The basic rule that should not be violated is that continuoU.S. ground loops should be avoided, i.e., a system should not be grounded at multiple points.

This could occur, for example, if the shield of the load cell cable were grounded at both ends.

Interface load cell cables are supplied with a braided shield which provides protection from electrostatic interference when properly grounded. This shield is floating (not connected) at the load cell end so that a "ground loop" will not be inadvertently created.

A basic system layout that is easily achieved and U.S.ually is satisfactory is as follows:

1. The load cell case is grounded by mechanical attachment to the structure to which it is mounted.
2. This structure should be properly grounded to the Electrical circuits which drive the excitation for the load cell.
3. The braided shield enclosing the load cell leads is grounded at the instrument and the instrument is grounded through the power cord.



Interface
FORCE MEASUREMENT SOLUTIONS.

EXCITATION VOLTAGE

INTRODUCTION

Unless otherwise specified, all Interface load cells are calibrated with an excitation voltage of 10 VDC.

Although Low Profile™ cells may be operated with excitation as high as 20 VDC, and Mini Series cells can be excited with up to 15 VDC, it is always best to operate a load cell at the same voltage U.S.ed for the calibration, becaU.S.e certain parameters of the cell are affected by the applied voltage.

The basic construction of a load cell consists of strain gages bonded to a flexure inside the load cell with a very thin layer of an Electrically insulating epoxy. Typically, four gages are connected together in a bridge circuit. When voltage is applied to the bridge, the current through the each gage generates heat, which is conducted through the epoxy into the larger mass of the flexure. ThU.S., the Temperature of the bridge is always slightly higher than the flexure during normal operation.

GAGE HEATING

Each 350 ohm leg of a bridge will dissipate over 71 milliwatts at 10 VDC excitation. Since power is proportional to the square of the voltage, the leg would be dissipating over a quarter of a watt at 20 VDC, but only 18 milliwatts at 5 VDC.

ZERO BALANCE

Slight differences in the Temperature coefficient of resistance in each leg of a bridge will caU.S.e the zero balance to shift slightly as the gage Temperature changes. The effect is U.S.ually small. For example, a change of excitation from 10.00 VDC to 10.25 VDC will caU.S.e a zero shift of less than 0.0014% of rated output.

SENSITIVITY

The gage factor of each gage is adjU.S.ted so as to compensate for the Temperature coefficient of the modulU.S. of the flexure. This matching is exactly valid only at an excitation of 10 VDC. An increase of excitation voltage to 10.25 VDC would lower the bridge sensitivity by only 0.001%, but U.S.e of 20 VDC would caU.S.e the sensitivity of a Low Profile cell to decrease by 0.07%, which could be significant. 20

VDC applied to Mini Series cell would caU.S.e a more serioU.S. effect due to gage heating, and could possibly even shorten the life of the cell.

CREEP

Creep is influenced by Temperature, but the magnitude and direction of the effect of large changes in applied voltage is not predictable.

At room Temperature, changing the applied voltage from 10.00 VDC to 10.25 VDC caU.S.es a negligible effect. However, increasing the voltage on a Low

Profile cell to 20 VDC could caU.S.e the creep to increase (or decrease) by less than 10% of the creep specification.

CONCLU.S.ION

BecaU.S.e of the inherent Temperature stability of the design of Interface load cells, reasonable shifts in excitation voltage will result in paraMetric shifts which would not be detectable in most normal applications.

However, in applications where the load cell is to be U.S.ed as a transfer Standard, or where the stability of the cell's characteristics is necessary, precautions should be U.S.ed

MOMENT COMPENSATION

Do you know if you have an accurate force reading?

In most applications it is difficult, if not impossible, to calculate or even estimate the effect of misalignments on the precision of a force measurement system. Moment sensitivity introduces errors into force measurements whenever forces cannot be applied precisely on-axis.

The Low Profile™ design by Interface has the intrinsic capability of canceling moment loads becaU.S.e of its radial design.

- The radial flexure beams are precision machined to balance the on-axis loading.
- The gages are precisely placed so that strains due to on-axis loads are additive and strains due to moment loads tend to cancel under actual moment loading.
- Interface U.S.es eight gages, as opposed to the four U.S.ed by many manufacturers, which helps to further minimize error from the loads not being perfectly aligned.
- Slight discrepancies between gage outputs are carefully measured and each load cell is adjU.S.ted to further reduce extraneoU.S. load sensitivity, to meet the Specifications in the table below.

RESISTANCE TO EXTRANEOU.S. LOADS

The INTERFACE Low Profile™ design provides optimum resistance to extraneoU.S. loads to insure maximum operation life and minimize reading errors. The above chart tabulates maximum allowable extraneoU.S. loads that may be applied singularly without Electrical or mechanical damage to the cell and the maximum error that can be expected from side forces or bending moments.

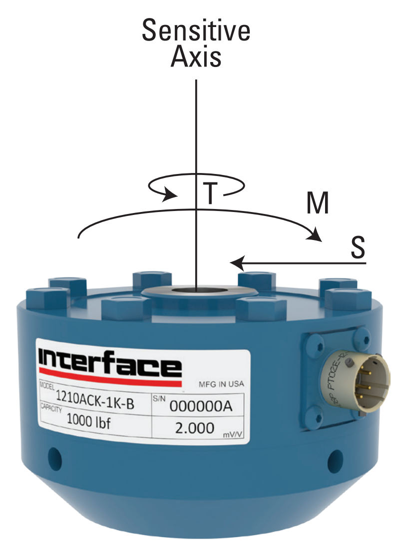
Several loads can be tolerated simultaneoU.S.ly if the total combined load is not more than 100% of the allowable maximum extraneoU.S. load.

Only Interface guarantees maximum extraneoU.S. load error and physically adjU.S.ts every load cell.

The Interface 1200 Series cells have eccentric load sensitivity less than ±0.25% of reading per inch, and the 1000, 1100, and 1600 Series are further adjU.S.ted to come in at less than ±0.1% of reading per inch.

Most competing load cells will have extraneoU.S. load error ten, or more, times higher than with a superior Interface load cell.

SERIES	S	M	T	MAX ERROR DUE TO S OR M (% RATED RANGE)
	Max Side Force (% Rated Range)	Max Moment (% Rated Range x 1 inch)	Max Moment (% Rated Range x 1 inch)	
1000	100%	100%	100%	0.10%
1100	40%	40%	40%	0.04%
1200	40%	40%	40%	0.10%
1500	40%	40%	40%	0.10%
1600	40%	40%	60 in-lb	0.04%
1800	100%	100%	100%	0.05%



TEMPERATURE COMPENSATION OF ZERO

THE ADVANTAGES OF FULL Temperature RANGE COMPENSATION

Temperature compensation of zero balance of load cells is conventionally performed U.S.ing the chordslope method. A partial-range implementation of this method, acting on a chord between room Temperature and one extreme Temperature is often U.S.ed. A better implementation is full-range U.S.ing three test Temperatures and acts on a chord between the cold and hot extremes.

The top curve on the plot represents the zero Temperature characteristics of an uncompensated load cell. This curve would ideally be a straight line but often has some nonlinearity such as shown here.

The objective of the compensation process is to rotate the curve to a more level position. The middle curve represents a compensation based on room Temperature (T_r) and hot Temperature (T_h) and is consequently labeled “r-h compensated.” The process equalizes the zero balance values at T_r and T_h.

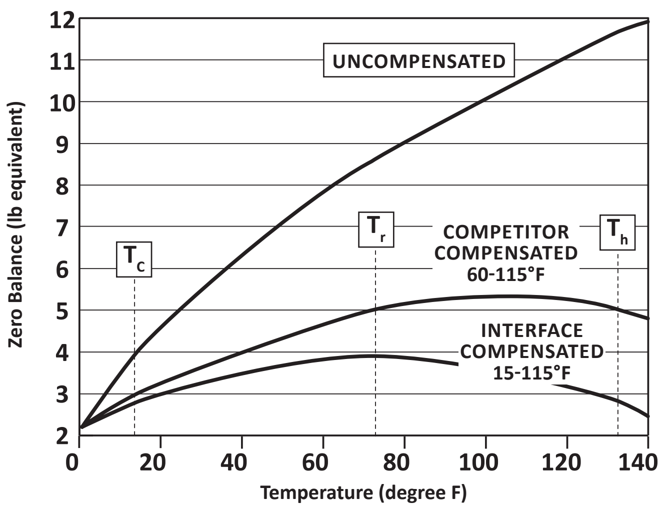
The lower curve represents a compensation based on cold Temperature (T_c) and hot Temperature (T_h) and is labeled “c-h compensated.” This process equalizes the zero balance values at T_c and T_h, producing a relatively full-range solution.

It is now apparent why the full range procedure (lower curve) is superior:

1. The slope of the characteristic near room Temperature, the Temperature at which most applications are of most interest, is near zero.

2. The total range of zero balance over the Temperature range of the plot is minimal, approximately one-half that of the partial-range compensated curve in this example.

COMPENSATED vs NON-COMPENSATED
Temperature Effect on Zero Compensation
2,000 lbf Load Cell Example



Every Interface Load Cell is Compensated Cold and Hot

FORCE MEASUREMENT SOLUTIONS.

INSTRUMENT CALIBRATION U.S.ING A SHUNT CALIBRATION

INTRODUCTION

Since a strain gage load cell is a passive Electrical device, there exists a simple, yet effective, method for checking the calibration of a load cell system in the field or when a means of applying actual forces is unavailable. Inducing an Electrical imbalance in the cell's bridge circuit will simulate the bridge imbalance caU.S.ed by the application of actual forces to the load cell. Then the system gain may be adjU.S.ted so that the system output signal or display indicates a known force on the load cell.

NOTE:

Be careful not to U.S.e Shunt Calibration as a substitute for actual force calibration of a system. Shunt Calibration merely supplies a known signal to the signal conditioning unit, in order to check its gain or span adjU.S.tment.

EQUIVALENT FORCE

On the Calibration Certificate for each Low Profile load cell, Interface routinely supplies the value of the equivalent force resulting from connecting a specified shunt calibration resistor across one leg of the bridge. For other types of cells, Interface will supply shunt calibration values on special request.

SHUNT CALIBRATION CONNECTIONS

The Standard connections U.S.ed by Interface for tension & compression shunt calibration are specified on the Calibration Certification for each load cell.

It is important that the Standard connection be U.S.ed, although a similar (but not equal) output would result from connecting to the opposite leg of the bridge.

Shunt calibration is relatively insensitive to small changes in Temperature, although the calibration is precisely correct only at the "Lab Standard" conditions noted on the load cell's Calibration Certificate.

RESISTOR VALUES

The following values of shunt resistors will caU.S.e an output of approximately 73% of Rated Output for the load cell types indicated when connected across the specified load cell terminals.

For 4 mV/V cells:

RS-100-30K (30,000 ohms, ±0.01%)

For 3 mV/V cells:

RS-100-40K (40,000 ohms, ±0.01%)

For 2 mV/V cells:

RS-100-60K (60,000 ohms, ±0.01%)

For 1 mV/V cells:

RS-100-120K (120,000 ohms, ±0.01%)

PROCEDURE

To perform a shunt calibration, U.S.e the following procedure:

1. Remove or stabilize all forces on the load cell.
2. AdjU.S.t the display or indicator ZERO to read exactly zero.
3. Connect the shunt calibration resistor to the terminals specified on the Calibration Certificate, and adjU.S.t the SPAN or GAIN until the display reads the force value stated on the Certificate.
4. Repeat the procedure to insure a valid calibration.

FORCE MEASUREMENT SOLUTIONS.

LOAD CELL PERFORMANCE AS AFFECTED BY CABLE LENGTH

INTRODUCTION

For high accuracy force measurement the effects of the cable on the measurement mU.S.t be considered.

For constant voltage excitation there are two effects of significance. These are:

1. An effect on the sensitivity due to voltage drops over the cable length.
2. An effect on the thermal span characteristics of the load cell due to the change of cable resistance with Temperature.

CABLE LENGTH EFFECTS

If the load cell is sold with a cable of any length, the sensitivity is determined with the installed cable in calibration and this is not a problem. For load cells with connectors, or if the cU.S.tomer adds cable himself, there will be a loss of sensitivity of approximately 0.37% per 10 feet of 28 gage cable and .09% per 10 feet of 22 gage cable. This error can be eliminated if a six wire cable is run to the end of the load cell cable or connector and U.S.ed in conjunction with an indicator that has sense lead capability.

Temperature EFFECTS

Since cable resistance is a function of Temperature, the cable response to Temperature change affects the thermal span characteristics of the load cell/cable system. For 6-wire systems this effect is eliminated. For 4-wire cables the effect is compensated for in the Standard cable lengths offered with the load cells if the load cell and cable are at the same Temperature at the same time. For non-Standard cable lengths, there will be an effect on thermal span performance. The effect of adding 10 feet of 28 gage cable is to caU.S.e a decrease in sensitivity with Temperature equal to 0.0008%/˚F (an amount equal to the Standard Interface specification). For an added 10 feet of 22 gage cable the effect is to decrease sensitivity by .0002%/˚F (one-fourth Interface spec). In many cases a cU.S.tomer can tolerate the degraded performance since our Standard specification is extremely tight. However, for long cable runs or high accuracy applications, this can be a significant factor. In such cases, the best approach to the problem is to run six wires to the end of the Standard cable length and sense the excitation voltage at that point. This eliminates the problem.

PROPRIETARY INTERFACE STRAIN GAGES

UNIQUE FORMULATION, MADE IN-HOU.S.E

Interface load cells are constructed with strain gages manufactured by Interface from a unique proprietary alloy which provides inherently Temperature compensated output. They are manufactured in our facility, in order to provide the necessary strict control of the formulation and the forming process.

MATCHED Temperature CHARACTERISTICS

The Temperature characteristic of the strain gages is adjU.S.ted by special processes to exactly match and counteract the Temperature characteristic of the modulU.S. of the load cell structural material, thereby providing output which is relatively Temperature insensitive. The bridge circuit is simple, reliability is high, and changes in output sensitivity caU.S.ed by Temperature variations are automatically compensated.

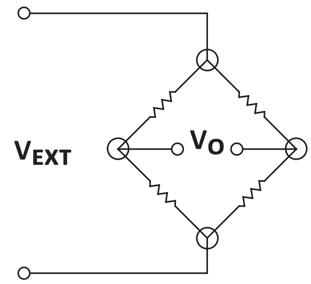
By contrast, competitive load cells U.S.e strain gage alloys which require the addition of Temperature sensitive resistors in the bridge circuit for compensation, thU.S. reducing reliability. Since the resistors aren't in intimate thermal contact with the cell's flexure, the dynamic thermal performance, resistance to thermal gradients, and thermal response times are also severely affected.

LONGER FATIGUE LIFE

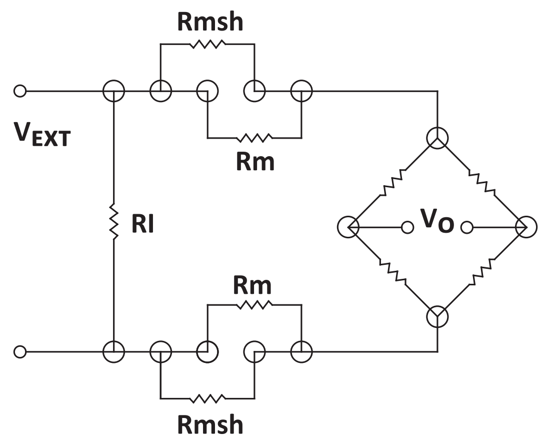
The Interface strain gage alloy provides significantly greater fatigue life than the widely-U.S.ed constantan gages U.S.ed by the competition.

HIGHER OUTPUT

A third advantage of the Interface strain gage is higher output, providing higher signal-to-noise ratio and opportunity for higher resolution in precision measurement applications.



INTERFACE LOAD CELL



TYPICAL COMPETITOR'S LOAD CELL

Rm = ModulU.S. compensating resistor

Rmsh = Fine trim for Rm

Ri = Bridge input resistance trim

FORCE MEASUREMENT SOLUTIONS.

WARRANTY AND REPAIR POLICY

WARRANTY

1. Interface warrants that its products shall be free from defects in material and workmanship for the full warranty period under normal and proper U.S.e when correctly installed. The warranty period for most load cells is two years and for other products is one year, from date of shipment by Interface.

2. Any Interface product, which proves defective in material or in workmanship within the warranty period, will be repaired or replaced free of charge provided that the buyer; (1) provides Interface with satisfactory proof of the defect and that the product was properly installed, maintained and operated within the limits of rated and normal U.S.age; (2) buyer obtains from Interface authorization to return the product; and (3) products claimed to be defective mU.S.t be returned with transportation charges prepaid, and will be returned to buyer with transportation charges collect unless the item is found to be defective, in which case, Interface will pay the return transportation charges.

3. The remedy set forth herein does not apply to damage to or defects in any product caU.S.ed by the buyer's misU.S.e or neglect, nor does it apply to any product which has been repaired or disassembled which in the sole judgement of Interface affects the performance of the product.

4. Interface makes no warranty concerning components not manufactured by it. However, in the event of the failure of any component or accessory not manufactured by Interface, reasonable assistance will be given to buyer in obtaining from the respective manufacturer whatever adjU.S.tment is reasonable based on the manufacturer's own warranty.

5. Interface expressly disclaims any liability to its cU.S.tomers, dealers, and representatives, and to U.S.ers of its products, and to any other person for special or consequential damages of any kind and from any caU.S.e whatsoever arising out of or in any way connected with the manufacture, sale, handling, repair, maintenance, or replacement arising out of or in any way connected with the U.S.e of Interface products.

6. Representations and warranties made by any person, including dealers and representatives of Interface, which are inconsistent or in conflict with the terms of this warranty (including but not limited to the limitations of the liability of, Interface, as set forth above), shall not be binding upon Interface unless reduce to writing and approve by an officer of Interface, Inc.

THIS EXPRESS WARRANTY SUPERCEDES ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

OBTAINING SERVICE UNDER WARRANTY

Advance authorization is required before any product is returned to Interface. Prior to the return of any product, write or call the Repair Department at Interface advising them of; (1) a part number; (2) a serial number of the defective product; (3) a technical description of the defect including specific test data, written observations on the failure and specific corrective action required; (4) a no-charge purchase order number (so the product can be returned to sender correctly); and (5) ship and bill addresses. Non-verified problems or defects may be subject to an evaluation charge. Please return the original calibration data with the unit.

REPAIR WARRANTY

All repairs of Interface products are warranted for a period of 90 days from date of shipment. This warranty applies only to those items which were found defective and repaired; it does not apply to products in which no defect was found and returned as is or merely recalibrated. Out of warranty products may not be capable of being returned to the exact original Specifications.

TERMS AND CONDITIONS

The following Terms and Conditions shall apply to any order between Interface Inc., (seller) and buyer, unless overridden by written agreement.

1. ACCEPTANCE

All orders and sales contracts are subject to acceptance or rejection by Interface and are not binding on Interface unless and until so accepted. Acceptance of an order by Interface constitutes a complete and binding contract governed by the terms and conditions of sale expressed herein and by the laws of the state of Arizona. Acceptance is at all time subject to availability for delivery of the goods covered by each order, and prices in effect at the time of shipment, unless otherwise agreed in a separate agreement signed by buyer and Interface.

2. CANCELLATION

In the event of cancellation, buyer will pay promptly upon receipt of invoice from Interface:

a.) The full contract price for all products which have been completed prior to receipt of notice of cancellation.

b.) All costs incurred by Interface in connection with the uncompleted portion of the order.

c.) Cancellation charges incurred by Interface on account of its purchasing commitments made to its suppliers under the order.

4. PATENTS

No license or other rights under any patents, copyrights or trademarks owned or controlled by Interface or under which Interface is licensed are granted to buyer or implied by the sale of products or services hereunder. Buyer shall not identify as genuine products of Interface products purchased hereunder which buyer has modified, or altered in any way nor shall buyer U.S.e Interface's trademarks to identify such products; provided, however, that buyer may identify such products as utilizing, containing, or having been manufactured from genuine products of Interface as modified or altered by buyer or buyer's representative. If products or services sold hereunder are manufactured or performed according to buyer's Specifications, buyer shall indemnify Interface against any liability for patent, copyright or trademark infringement on account of such manufacture or performance.

5. PRICES

Unless otherwise stated, prices are subject to change without notice. No cash discounts or other discounts for prompt payment are offered unless specifically stated on the face thereof. The prices quoted are based upon the manufacture of the quantity and type ordered and are subject to revision when interruptions, engineering changes, or changes in quantity are caU.S.ed or required by buyer. Clerical errors made by Interface are subject to correction.

6. TAXES & OTHER CHARGES

To the extent legally permissible, all present and future excise levies, taxes, or any similar charges imposed by any federal, state, foreign or local authority which Interface may be required to pay or collect, upon or with reference to the sale, purchase, transportation, U.S.e or consumption of products or services, including taxes measured by the receipts therefrom (except net income and franchise taxes), shall be for the account of buyer.

7. DELIVERY

All sales are F.O.B. Interface's Plant. Delivery dates are approximate and estimated, and are based on prompt receipt of all necessary information from buyer. Interface may make partial shipments of any one or more items covered by the quotation or acknowledgment. Interface assumes no liability for loss, damage, or consequential damages due to delays.

8. TERMS OF PAYMENT

All invoices are payable only in U.S. funds. Payment terms are net 30 days. Credit and delivery of products shall be subject to the approval of Interface to whom all bills are payable and who reserves the right to alter the terms and set a limit of credit. Each shipment shall be treated as a separate and independent contract; but if the buyer fails to fulfill the terms of payment under this or any other contract, Interface at its option may defer further shipments, until payment have been made. Invoices that are not paid by the due date are subject to a late charge of 1.5% per month on the unpaid balance.

9. CONFIDENTIAL INFORMATION

Selected software and hardware, drawings, diagrams, manuals, Specifications, and other materials furnished by Interface relating to the U.S.e and service of products furnished hereunder, including any information which may be identified as proprietary to Interface. Such software and hardware, diagrams, manuals, drawings, Specifications and other materials, have been developed at great expense and are considered to be trade secrets to Interface and buyer may not reproduce them in any way without the express written permission of Interface except as needed to operate and maintain the equipment supplied by Interface.

10. DISPUTE RESOLUTION

This agreement and all transactions hereunder are governed by the laws of the state of Arizona.

7418 East Helm Drive • Scottsdale, Arizona 85260 • 480.948.5555 • www.interfaceforce.com

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Interface is the world's trusted leader in technology, design and manufacturing of force measurement solutions. Our clients include a "who's who" of the aerospace, automotive and vehicle, medical device, energy, industrial manufacturing, test and measurement industries.

Interface engineers around the world are empowered to create high-level tools and solutions that deliver consistent, high quality performance. These products include load cells, torque transducers, multi-axis sensors, wireless telemetry, instrumentation and calibration equipment.

Interface, Inc., was founded in 1968 and is a US-based, woman-owned technology manufacturing company headquartered in Scottsdale, Arizona.

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